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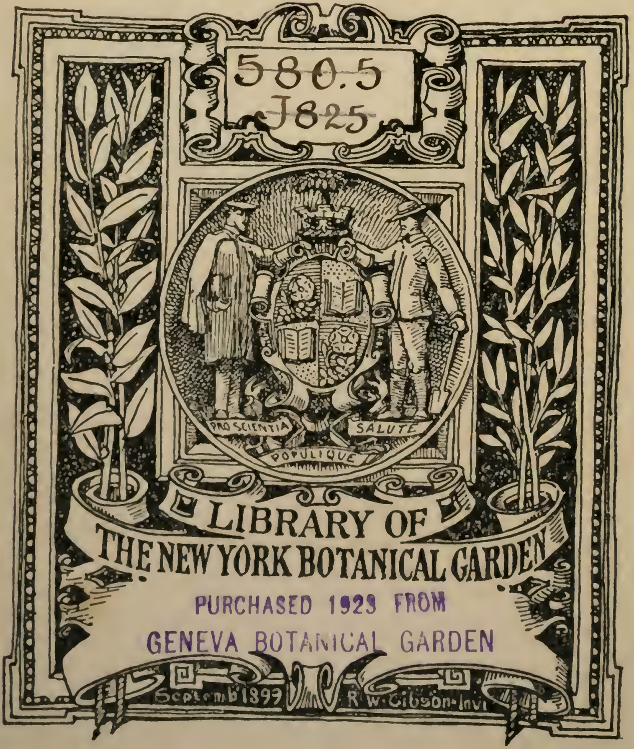
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JAMES BRITTEN, K.C.S.G., F.L.S.

LATE SENIOR ASSISTANT, DEPARTMENT OF BOTANY, BRITISH MUSEUM.

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THE GENUS AMARALIA.

By H. F. Wernham, D.Sc., F.L.S.

This Rubiaceous genus was first published by Bentham and Hooker in their *Genera Plantarum*, ii. 90 (1873). They adopted the name from Welwitsch's MS. on no. 2571 of his Angola (Golungo Alto) collection; this plant appears in Welwitsch's Apont. (1858) 585 as *Gardenia bignoniæflora* Welw. Hiern (Fl. Trop. Afr. iii. 112) identifies the same plant with *Gardenia Sherbourniæ* Hook. Bot. Mag. t. 4044 (1844), which originated from Sierra Leone. Don, in Loud. Encyc. Pl. 2nd Add. Supp. 1322 (1855), raises the latter to separate generic rank as *Sherbournia foliosa*; but he gives no acceptable generic description.

M. Hua, in an excellent paper on "Le Genre *Sherbournia* Don" (Bull. Soc. Hist. Nat. Autun, xiv. (1901) 385), has adopted the name without question; but wrongly, it seems, to judge by the customary conventions governing plant-descriptions, for the first legitimate description of *Sherbournia* as a genus is that of M. Hua himself. The Sierra Leone and the Angola plants just referred to are certainly not conspecific, as we shall see, but they are undoubtedly congeneric; so that if they are to be accorded generic rank separately from *Randia* and *Gardenia*, with which they have been confused to a considerable extent (see synonymy *infra*), *Amaralia* is the proper name for the genus.

In the *Flora of Tropical Africa*, iii. (1877) Hiern rightly adopts the name *Amaralia*; but in his Cat. Welw. Afr. Pl. (1898) the same author reverts to the name *Sherbournia*, which must be regarded as a *nomen nudum*.

After a careful examination of all the material of *Randia* and *Gardenia* available in the principal British herbaria, as well as a perusal of the descriptions of species unrepresented therein, I have no hesitation in supporting the claim of *Amaralia* to separate generic rank, if only on the strength of the calyx-character; the calyx-lobes being large, foliaceous, and dextrorsely contorted in æstivation. The corolla, too, has distinctive features, being broadly and relatively rather shortly campanulate, with somewhat dense silky indumentum.

The corolla-character, however, is not in itself a safe criterion; I have found considerable confusion in more than one European herbarium in this regard—many true *Randia*-species, with shortly-toothed calyx-lobes, being relegated to *Amaralia*, evidently on account of the shape and greyish silky covering of the corolla when dried. These "Amaralioid" Randias are dealt with at the end of the present paper.

The calyx-lobes of all the species of *Randia* and *Gardenia* which have come under my notice are either short and tooth-like, or, if elongated, are relatively very narrow and mutually distant, and, in any case, valvately arranged in the bud; with one exception, namely, *Randia penduliflora* K. Schum. (in Engler, Pfl. Ost-Afr. C. 380); this has relatively broad calyx-lobes, dextrorsely contorted in the bud. This species I propose to transfer to *Amaralia*, a suggestion supported by the shape and indumentum of the corolla.

M. Hua (*loc. cit.*) recognizes five species of the genus, which, as we have seen, he calls *Sherbournia*, and gives a valuable discussion of the genus and lucid descriptions of the species; but I am unable to agree with his conclusions entirely, as will appear in the systematic account of the species which I proceed to submit. It would appear that M. Hua has been somewhat handicapped by paucity of material; but his carefully prepared account has been of very great service to me in my own investigation. He says, truly, "Les cinq espèces que nous venons d'énumérer ne sont probablement pas les seules du genre . . . qui se trouvent en Afrique tropicale."

I have found that the principal critical features determining the species are the venation of the leaves, the size and colours of calyx and corolla, and the nature of the fruit-surface. Two species, *A. Buntingii* and *A. penduliflora* are distinct in their tree-habit, the rest being scandent shrubs.

The distribution is of interest, and supports, more or less, the delimitations of the species. *A. Sherbourniæ* occurs westward to Sierra Leone, but its most eastern and at the same time most southern limits are in the Central Cameroons (Yaunde). *A. heinsioides* has a similar westward distribution, but claims an isolated home in Central Africa, in Monbuttu and Niam-Niam lands. The allied *A. bignoniæflora* seems to be essentially an Angolan plant, although M. Hua relegates a Congo specimen (*loc. cit.* 396) to this species. I have had, unfortunately, no opportunity of examining this plant; but its flower-colour, "rose brunâtre," suggests the possibility that it may be a distinct species. In any case the plant was collected no further north of its original place in Angola than Kitabi (French Congo), where the presence of any Angolan species would not be surprising. All the specimens of *A. calycina* (in the restricted sense) were gathered in Sierra Leone. *A. Zenkeri* occurs from Benin in the west to Bipinde, in the Cameroons, in the east; the Talbots have provided several excellent examples of this species from Southern Nigeria. *A. Millenii* has not been found outside Lagos; *A. Huana* is South-Nigerian. *A. penduliflora*, one of the two tree-species, is East-African. The remaining species are based upon single specimens; *A. Buntingii*, the other tree-species, was collected in Gola, Liberia;

and *A. micrantha*, with quite small red flowers, was found by E. W. Foster in Oloke Meji, Southern Nigeria.

The genus is thus confined almost entirely to Western Tropical Africa, Upper and Lower Guinea, from Sierra Leone, through the various districts along the coast, to Angola, the exceptions being provided by *A. heinsioides*, which we have found in Central Africa, and *A. penduliflora*, in East Africa.

I proceed to furnish a systematic account of the ten species which I have had an opportunity of examining; this I preface with a clavis.

AMARALIA.

- Erect plants (trees or shrubs), with smooth fruits.
  - Calyx-lobes barely 1 cm. long; leaf acute at base; fruit narrowly ellipsoidal (East Africa) .... 1. *penduliflora.*
  - Calyx-lobes over 2 cm. long; leaf cordate; fruit globose (Liberia) .... 2. *Buntingii.*
- Climbing shrubs.
  - Calyx-lobes over 15 mm. long.
    - Fruit smooth, unribbed.
      - Corolla 3–4 cm. long, or more.
        - Leaves acute at base, youngest relatively narrow... 3. *Sherbourniæ.*
        - Leaves cordate, broadly elliptical.
          - Corolla-tube less than 4 cm., purplish; calyx purple, with broad obtuse lobes .... 5. *bignoniæflora.*
          - Corolla-tube over 4·5 cm., white outside, with rose lobes; calyx-lobes narrow acute.......... 6. *heinsioides.*
      - Corolla barely 2 cm. long.......... 4. *calycina.*
    - Fruit prominently ribbed.
      - Secondary leaf-veins 5–6 pairs.
        - Young leaves small lanceolate, very acute.......... 7. *Huana.*
        - Young leaves large elliptical, not markedly acute.
          - Fruit very narrow, often curved .... 8. *Millenii.*
      - Secondary leaf-veins 10 pairs .... 9. *Zenkeri.*
  - Calyx-lobes barely 7 mm. long, corolla correspondingly small .... 10. *micrantha.*

A. (*Sherbournia*) *Brazzaei* (see below) is unknown to me.

1. A. PENDULIFLORA, nom. nov. *Randia penduliflora* K. Schum. in Engler, Pfl. Ost-Afr. C. 380.

East Africa: Derema, *Volkens* 127! Amani, *Herb. Amani* 394! Hb. Mus. Brit.

The Amani plant, according to the MS. on the label in the National Herbarium, was distributed as *Randia sericacantha* K. Sch. This name appears as a *nomen nudum*, published by Engler in Notizbl. Bot. Gart. Berlin, iii. 84; but in any case the specimen cited is specifically identical with the Derema plant. The species is readily distinguished by the tree-habit and small calyx.

2. **A. Buntingii**, sp. n.

Arbor ramulis glabris gracilibus rectis lævibus; *folia* chartacea obovata 12–20 cm. × 6·5–9 cm., leviter acuminata basi cordata, supra glaberrima subtus in venis obscuriuscule sericea, venis secundariis utrinque 6. *Flores* in axillis solitarii; *calycis* lobi oblongi, vix

2·5 cm. longi acutissimi, tubus 1 cm. longus. *Fructus* globosus, aurantiacus 6–8 cm. diam.

Hab. Liberia: Gola, in old farm-land, 20 April, 1910, *Bunting*! Herb. Mus. Brit.

Distinct in its tree-habit and globose fruit. The numerous seeds are embedded in a gelatinous pulp which is eaten by the natives.

3. A. SHERBOURNIÆ, nom. nov. *Gardenia Sherbourniæ* Hook. f. Bot. Mag. (1844) t. 4044. *Randia Sherborniæ* Hook. Fl. Niger (1849) 385. *Sherbournia foliosa* G. Don in Loud. Encycl. Pl. Supp. ii. (1855) 1322; Hua, *loc. cit.* 395. *Pro parte Amaralia bignoniæflora* Welw. ex Hiern in Flor. Trop. Afr. iii. (1877) 112. *Pro parte A. calycina* K. Schum. in Engler Pflanzenf. IV. iv. (1891) 78.

Hab. Hort. Sherbourne! from Sierra Leone. Sierra Leone: without more precise locality, *Afzelius*! *Barter*! *Smythe* 10! *Witford*! Regent, May 1857, *Barter*! 8 December, *Scott Elliot* 4110! Sherboro, *Scott Elliot* 5763! 5764! Kurusa, Kafoga, Limba, 6 April, 1892, *Scott Elliot* 4602; Jala, 7 January and 9 May, 1914, *Bunting* 4! 49! Liberia: Sinoe Basin and Monrovia, *Whyte*! Ashanti: Kumassi, Assin Yan, *Cummins* 143! Cameroons: Yaunde (800 metres elev.), *Zenker* 370! 733! Hbb. Mus. Brit. & Kew.

The critical characters in this case are the rather narrow leaves acute at the base, with no more than half-a-dozen pairs of secondary veins, the small corolla, white or cream, exserted barely half its length from the very ample glabrescent greenish calyx, and the unribbed red (Cummins) fruit. The floral colours, which agree with those of the cultivated specimens, are given on the authority of Mr. Bunting, a careful collector, who tells us that the plant climbs by means of its petioles. According to Scott Elliot, a common name about Kafoga for this species is "Kwia," and the plant is used by natives for coughs.

4. A. CALYCINA K. Schum. in Engler, Pflanzenf. IV. iv. (1891) 78. *Pro parte A. bignoniæflora* Hiern in Fl. Trop. Afr. iii. (1877) 112. *Gardenia calycina* Don, Gen. Syst. iii. (1834) 497. *Randia Doniana* Benth. in Hook. Niger Flora (1849) 385. *Non Sherbournia calycina* Hua *l. c.* 398.

Hab. Sierra Leone: *Don* 116! et s. n.! Hbb. Mus. Brit. & Kew.

This species has been the subject of considerable confusion. K. Schumann (*loc. cit.*) included all the then-known species of *Amaralia* under this name, but we adopt it in a restricted sense, it being the first specific name under which the species was described. Don (*loc. cit.*) clearly intimates that the fruit is not costate; but Hua (*loc. cit.*) identifies his *Sherbournia calycina*, based on a specimen with strongly-ribbed fruits collected by Barter at Eppah, with Don's species. Comparison of the types, and of a considerable amount of other correlated material, has convinced me that this is incorrect; and that Hua's *Sherbournia calycina* must be renamed, and treated as a new species (*v. infra*, no. 7).

The distinctive characteristics of the species are the small corolla and the smooth fruit.

5. A. BIGNONIÆFLORA Welw. ex Hiern in Flor. Trop. Afr. iii. (1877) 112. *Pro parte A. calycina* K. Sch. *loc. cit. Gardenia bignoniæflora* Welw. Apont. (1858) 585. *Sherbournia foliosa* Hiern, Cat. Welw. Afr. Pl. ii. (1898) 466, *non* Don. *S. bignoniæflora* Hua, *loc. cit.* 396. *Randia heinsioides* Hua, *loc. cit.* non *R. heinsioides* Schwf. MS. ex Hua.

Hab. Angola: Golungo Alto, *Gossweiler* 4410! Eastern Queta, December 1854, *Welwitsch* 2571! Cazengo, *Gossweiler* 721! 5363! Hbb. Mus. Brit. & Kew.

Allied to *A. heinsioides*, but the corolla is smaller and differently-coloured, and less exserted from the calyx, which has obtuse broad lobes. According to Welwitsch the corolla is rose-violet, purple inside, and the calyx purple.

6. **A. heinsioides**, sp. n. *Randia heinsioides* Schwfth. MS. ex Hua in Bull. Soc. Hist. Nat. Autun. xiv. (1901) 391. *Pro parte Sherbournia bignoniæflora* Hua, *loc. cit.*

Frutex scandens ramulis nisi novissimis sericeis glabris striatis griseis; *folia* plerumque late elliptica, ad ca. 15 cm. × 7 cm., leviter acuminata basi sæpius tandem cordata, supra glaberrima subtus nisi in venis sericea glabra, venis secundariis utrinque 5 v. 6; *stipulæ* mox deciduæ anguste oblongæ obtusissimæ 12–15 mm. longæ. *Flores* magni per paria in axillis in pedunculo crasso sericeo 1 cm. longo dispositi. *Calycis* extus læviter sericei mox glabrescentis tubus supra ovarium hemisphæricus 14 mm. diam., lobi oblongi apice rotundati 2·2 cm. × 7 mm. *Corollæ* tubus 4·5 cm. excedens sub lobos 3·3 cm. latus, lobi latissimi rotundi 1·8 cm. × 2·1 cm. *Fructus* lævis elongato-ellipsoideus 3 cm. × 1·2 cm.

Hab. Central Africa: Monbuttu-land, Kussumbo, 16 March, 1870, *Schweinfurth*, 3142! Niam-Niam-land, Diamvonu, 6 March, 1870, *Schweinfurth*, Sér. ii. 15! Sierra Leone: near Kafogo, 6 April, 1892, *Scott Elliot* 5602! Gold Coast: Finsenase, near Obuase, 21 March, 1912, *Chipp* 149! Hbb. Mus. Brit. & Kew.

Distinguished by its large, broad, cordate leaves, and large flowers with relatively narrow calyx-lobes. Schweinfurth says that the corolla is whitish outside, purplish inside, with rose-coloured lobes; the stigma is white. Nom. vulg. (A. Banga) "Mbittah." A specimen was until recently in cultivation in the Hope Gardens, Jamaica (Herb. Bot. Dep. Jam. 19!), flowering in March; but I learn that the plant has now been removed.

7. A. HUANA, nom. nov. *Sherbournia calycina* Hua, *loc. cit.* 398.

Hab. Nigeria: Eppah, *Barter*! Bagroo R., *Mann* 819! Yoruba, 7 May, 1890, *Moloney*! Hb. Kew.

This species is characterized by the strongly sulcate ovary and relatively stout, ribbed fruit, and narrow leaves with six pairs of lateral veins at most. Hua associates Mann's plant with this, correctly, I believe; for although the latter bears no fruits, the "calyx-tube" shows every promise of being strongly costate: also the calyx-lobes are much smaller and more acute than those of *A. Sherbourniæ*, to which Mann's specimen might otherwise be relegated. I have included the Yoruba plant under the same head on similar evidence.

8. **A. Millenii**, sp. n.

Frutex scandens; *folia* glabra, late elliptica, 11–18 cm. × 5–8 cm., brevissime v. vix acuminata nec acuta, basi acuta nec cordata, petiolo valido aspero 2·5 cm. v. longiore; *stipulæ* anguste oblongæ ± 1 cm. × 2–3 mm. acutæ. *Flores* in axillis solitarii; *calycis* lobi late oblongi acutissimi vix 1 cm. longi, ca. 6 mm. lati. *Corollæ* tubus 3 cm. longus, lobi lati breves. *Bacca* conspicue necnon crebre costata, glaberrima, angusta, 3·5–4 cm. longi, vix 1 cm. diam., sæpe curvata.

Hab. Lagos: Ebule Mella, Muni Road, 12 December, 1893, *Millen* 31! Iddo Island, November 1894, *Millen* 143! Hb. Kew.

Very distinct in its ample leaves with acute base, and long narrow-ribbed fruits.

9. A. ZENKERI, nom. nov. *Sherbournia Zenkeri* Hua, *loc. cit.* 399. *Pro parte Amaralia calycina* K. Schum. in Engler, Pflanzenf. IV. iv. (1891) 78. Nom. vulg. Benin: "Alleleh"; Yoruba: "Odan."

Hab. Benin: Ipopon, 16 April, 1908, *Foster* 198! S. Nigeria: Oban, *P. Amaury Talbot* 202! 269! Eket and Degema, *P. Amaury Talbot*, s. n.! 3603! 3740! Cameroons: Ambas Bay, February 1862, *Mann* 1329. Bipinde, *Zenker* 912; 1674! 2506! 2892! 3077! 3308! 3235! 4431! Hbb. Mus. Brit. & Kew.

Readily distinguished by the close leaf-venation (see clavis) and the ribbed fruits. The flowers are commonly borne three together on each axillary peduncle.

10. **A. micrantha**, sp. n.

Frutex scandens, ramulis gracilibus, glabris mox cortice griseo striato indutis. *Folia* oblanceolata ad elliptica, utrinque acuminata apice acuta v. subacuta, 8–12 cm. × 3–4 cm., venis secundariis utrinque 5, petiolo pro rata tenuiusculo ad 1 cm. longo; *stipulæ* oblongæ obtusæ 6 mm. × 3 mm. *Flores* rosei in axillis solitarii; *calycis* lobi anguste oblongi acuti 7 mm. × 3 mm. glabrati; ovarium conferte subtiliter striato-costatum; *corollæ* 2–2·5 cm. longæ lobi breves rotundati.

Hab. Southern Nigeria: Oloke Meji, *Foster* 295! Hb. Kew.

"Climber, red flowers." Distinct in the small flowers, narrow calyx-lobes, and finely costate ovary. The fruit is not available; but comparison of the ovary with that of *A. Zenkeri*, with prominently costate fruits, leads to the conviction that *A. micrantha* should be included among the ribbed-fruited species.

Species mihi ignota.

A. BRAZZÆI, nom. nov. *Sherbournia Brazzæi* Hua, *loc. cit.* 397.

This species is based on specimens collected by Thollon (no. 85) in the forests about Brazzaville, in the French Congo. Its essential specific characters seem to be the 6–8 pairs of secondary leaf-veins, linear-lanceolate acute calyx-lobes, and smooth fruit. The colour of the corolla—"lie de vin extérieurement, rouge vermillon intérieurement"—is also distinctive.

AMARALIOID SPECIES OF RANDIA.

In consideration of the confusion already referred to between certain species of *Randia* on the one hand, and the genus *Amaralia* on the other, it is desirable to deal with these species in this place.

M. Hua makes frequent reference in his paper on *Sherbournia*, already cited (*suprà*, p. 1), to a *Randia amaralioides* K. Schum., which had appeared previously only in manuscript, as the determination on the labels of several of Zenker's Cameroon plants; among these were more than one species of *Amaralia*. M. Hua quotes, as a type of this, *Zenker* 1017; this, however, is undoubtedly identical with *Staudt* 12!—also a Cameroon plant—the type of *R. streptocaulon* K. Schum. in Engler, Bot. Jahrb. xxiii. (1897) 440. This has an obscurely shortly-toothed calyx-limb; in some other respects it resembles an *Amaralia*—particularly in the climbing habit, the stipules, the shape and venation of the leaves, the shape and indumentum of the corolla, and the shape and surface of the fruit. The resemblance, in fact, is so close as to tempt M. Hua (*loc. cit.*) to include this *R. amaralioides* in his *Sherbournia*; he does not, however, quite succumb to this temptation. It seems clear, I think, that this resemblance is due to homoplasy, to similarity of form induced by similarity of habit and habitat; most species of *Amaralia*, we have seen, are scandent shrubs, the climbing being helped largely by the strong petioles; and the habit of *R. streptocaulon* and its immediate allies is precisely similar. The toothing of the calyx, *ceteris paribus*, would not presumably be affected in descent, at any rate so rapidly as the vegetative parts, by this habit; wherefore its differences in these cases provide a critical characteristic, determining a generic race descended from a *Randia*-like ancestor from which arose also, later in evolutionary history, *R. streptocaulon* and its near relatives.

This conclusion receives no little support from the existence of other "Amaralioid" species; three have been described before, three others are, I believe, new. For the sake of completeness I include all the Amaralioid species, old and new, in the following systematic account, preceded by a clavis. All these seven *Randia*-species have a persistent tubular calyx-limb with short, or in some cases obscure, teeth. All the specimens in the National and Kew herbaria are quoted below.

These species display an interesting parallel series to those of *Amaralia*. The relatively small-leaved *R. streptocaulon* corresponds with *A. Sherbourniæ*, in distribution as in other points, for the Cameroons is its eastern and southern limit. *R. amaraliocarpa*, with prominently ribbed fruits, is paralleled by *A. Zenkeri*, with similar distribution—*i. e.* Upper Guinea. *R. curvipes* goes hand-in-hand with *A. bignoniæflora* in Angola. *R. castaneofulva* in Angola and *R. hapalophylla* and *R. annulata* in Upper Guinea are sharply distinct in regard to their leaf-indumentum; otherwise they are very *Amaralia*-like. Lastly, *R. cladantha*, a tree-species of Nigeria and the Cameroons, closely resembles the East-African *A. penduliflora* in habit, in vegetative system generally, and in the cauliflorous inflorescence.

Key to the Amaralioid species of Randia.

Mature leaves glabrous beneath or with some closely-adpressed hairs on veins.
Leaves more or less elliptical.
Flowers 3–5 or more per axil; stipules obtuse-ovate; young leaves acute at base, elliptical.
Corolla barely 2 cm. long .... 1. *R. streptocaulon.*
Corolla 3 cm. or longer .... 2. *R. amaraliocarpa.*
Flowers 1–2 per axil; stipules oblong, acute; leaves rounded at base .... 3. *R. curvipes.*
Leaves lengthily acuminate to base, obovate or oblanceolate (Tree) .... 4. *R. cladantha.*
Mature leaves velvety pubescent or tomentose beneath.
Indumentum not ferruginous; branchlets rapidly glabrate. Corolla-tube 20 mm. or longer .... 5. *R. hapalophylla.*
Indumentum conspicuously ferruginous; branchlets rufous-tomentose. Corolla-tube 12 mm. .... 6. *R. castaneofulva,*
Leaves with rather long patent hairs beneath .... 7. *R. annulata.*

1. RANDIA STREPTOCAULON K. Schum. in Engler, Bot. Jahrb. xxiii. (1897) 440; non Wernham in Cat. Talb. Nig. Pl. (1913) 131. *R. amaralioides* K. Schum. ex Hua in Bull. Soc. Hist. Nat. Autun, xiv. (1901) 389.

Hab. Cameroons: Lolodorf, *Staudt* 12! Bipinde, *Zenker* 1017! 2123! 4965! Batanga, *Bates* 275! Hbb. Mus. Brit. & Kew.

2. **R. amaraliocarpa**, sp. n.

Frutex scandens nisi inflorescentia glaberrimus; *folia* subcoriacea elliptica, breviter acuminata subacuta, venis secundariis utrinque 5–6, basi acuta v. obtusiuscula, *petiolo* validiusculo scandenti-curvato, *stipulis* mox deciduis oblongis obtusis. *Cymæ* abbreviatæ axillares ±6-flor., lignosæ. *Calyx* extus dense griseo-sericeus, latissime brevissime dentatus; *corolla* majuscula, extus dense argenteo-sericea. *Fructus* oblongo-ellipsoideus, prominentissime 10-costatus, calyce persistente tubulari sericeo coronatus.

Hab. South Nigeria: Eket, main road to Oron, mostly farm-clearings, *P. Amaury Talbot* 3021! Hb. Mus. Brit.

This is easily distinguished by the glabrous leaves, many-flowered cymes, and the large corolla. Mrs. Talbot gives close details of colour: the body of the tube is cream-yellow; the lobes have dark-purplish to black spots. The calyx is "bronzy green, with greyish 'silk'." The "centre" (stigma and style) is cream-coloured, with dark red lines. *Leaves* 12 cm. × 5 cm.–17 cm. × 8 cm.; *petiole* to 1·5 cm., or rather longer; *stipules* attain about 1·5 cm. × ·5 cm. before falling. The strongly-ribbed ovary is 6 mm. long in the mature flower; *calyx*-limb 9 mm. *Corolla*-tube exserted about 2 cm. from calyx; lobes ca. 6 mm. × 5 mm. *Fruit* about 3·5 cm. long, 1·7 cm. in diameter, crowned by calyx little, if at all, accrescent.

3. **R. curvipes**, sp. n.

Frutex scandens, ramulis glabris subvirgatis gracilibus. *Folia* glabra elliptica vix acuminata apice obtusiuscula basi rotundato-truncata, *petiolis* validis sæpius tandem tumidis curvatis, venis secundariis utrinque 6; *stipulæ* mox deciduæ oblongo-lanceolatæ acuminatæ acutissimæ. *Flores* 1–2 in axillis (apertum non vidi);

calycis dentes alabastro angusti acutissimi acuminati. *Fructus* ellipsoideus prominentissime costatus, in costis dense aliter sparsiuscule sericeus, a calyce dense sericeo dentibus angustis necnon longiusculis coronatus.

Angola: *Gossweiler*! Hb. Mus. Brit.

The nearest ally is *R. amaraliocarpa*, from which this species is easily distinguished by the leaf-shape. *Leaves* 11·5 cm. × 6 cm. with stalks up to rather more than 1 cm. long when uncurled; *stipules* 1·3 cm. × 3·5 mm. *Fruit* 2 cm. × 1 cm., crowned by calyx nearly 1 cm. high (including the erect teeth).

4. R. CLADANTHA K. Schum. in Engler, Bot. Jahrb. xxviii. (1900) 62; Wernham in Cat. Talb. Nig. Pl. (1913) 131.

Hab. Cameroons: Bipinde, *Zenker* 1540! 1872! 2621! 2885! 3318! South Nigeria: Agege, *Foster* 223! Wet zone, Ofara—Oluwa, July 1909, *Kitson*! Oban, *P. Amaury Talbot* 145! 214 *b*! Western Prov., *Thompson*! Hbb. Mus. Brit. & Kew.

Easily distinguished by the large leaves gradually narrowed to the base, with oblong obtuse stipules 25 mm. or longer, and the tree-habit.

5. **R. hapalophylla**, sp. n. *R. streptocaulon* Wernham in Cat. Talb. Nig. Pl. (1913) 131.

Frutex scandens ramulis validiusculis mox glabris cortice fusco-griseo indutis. *Folia* lata obovata ad elliptica, vix acuminata apice acutissima, supra glaberrima nitentia, subtus præsertim in venis densiuscule dulce tomentoso-pubescentia, venis secundariis subtus prominentissimis utrinque 10; *stipulæ* ovatæ sericeæ. *Cymæ* ±7-floræ abbreviatæ; *calycis* tubus cylindricus, sinuato-dentatus; *ovarium* sulcatum; *corolla* campanulata dense sericea, lobis latis ovato-rotundatis. *Fructus* subglobosus, velutinus obtuse costatus.

Hab. South Nigeria: Oban, *P. Amaury Talbot* 211 A! Cameroons: Bipinde, *Zenker* 3512! 3032 *a*! Abonando, 25 May, 1902, *Rudatis* 66! Hbb. Mus. Brit. & Kew.

Allied to *R. streptocaulon*, but at once distinguished by the size and indumentum of the *leaves*. The latter measure 16–21 cm. × 8–12 cm., with stalks up to 2·5 cm. long; *stipules* 1·5 cm. × 8 mm. *Calyx*-limb in the flower nearly 1 cm. long; *corolla*-tube exserted 1·2–1·8 cm. from calyx, with lobes about 8 mm. × 7 mm. *Fruit* 2·3 cm. × 2 cm., crowned by calyx 1·3 cm. high.

6. R. CASTANEOFULVA S. Moore in Journ. Linn. Soc., Bot. xxxvii. (1906) 304.

Hab. Angola: Cazengo, *Gossweiler* 621! Hb. Mus. Brit.

At once recognizable by the snuff-coloured tomentum on the under-side of the leaves, and on calyx and fruit.

7. R. ANNULATA K. Schum. in Engler, Bot. Jahrb. xxiii. (1897) 435.

Hab. Gaboon: Munda, Sibange Farm, 25 October, 1881, *Soyaux* 306!

The leaves are very rounded, even minutely cordate, at the base; the corolla 6 cm. long.

HEPATICS IN WEST CORNWALL.

By W. E. Nicholson.

It is often the best-worked localities which continue to produce the greatest number of novelties. The apparent inexhaustibility of Ben Lawers is an instance of this. It should therefore scarcely be a matter of surprise that the rich district of West Cornwall should also continue to produce novelties; and some of the hepatics which I gathered at the Lizard and Carbis Bay, where I spent a few days at the end of March and beginning of April last, may be worthy of record.

Riccia Warnstorfii Limpr. Not uncommon on the cliffs near the sea, Housel Bay, the Lizard, in company with *R. Lescuriana* Aust. and *R. sorocarpa* Bisch. Nearly all the plants are more or less ciliate, and I am tempted to think that the plant which has been recorded from this district as *R. ciliata* Hoffm. may really belong to *R. Warnstorfii*.

R. nigrella DC. Sparingly on the cliffs at Housel Bay, often in a slightly drier habitat than the other species.

Fossombronia Crozalsii Corbière (Rev. Bry. 1903, p. 13). In rather large patches in moist places on the cliffs at Housel Bay; often growing with *Riccia Lescuriana* Aust. Mr. Macvicar and M. Douin confirm the identification of this plant, which is new to Britain. It is described by M. Corbière (*loc. cit.*) as follows: "Vegetative characters and habit of *F. cæspitiformis* De Not. Spores very distinct, subglobular, 38–40 μ in diameter, intermediate in dimensions between those of *F. angulosa* (Dicks.) Raddi and *F. Dumortieri* (Hüb. & Genth.) Lindb., and similarly reticulate-areolate, areolæ subhexagonal, as in the two last-mentioned species, but much smaller and more numerous, surrounded by a fairly high membrane, which makes the contour of the spores appear spinulose; elaters with 2–3 spirals, generally 2."

The plant from Housel Bay agrees with this description, except that the spores are generally larger, averaging 45 to 50 μ, and, although many of them are distinctly areolate, they recall those of *F. Husnoti* Corbière rather than those of *F. angulosa* or *F. Dumortieri*, and M. Corbière's figure of the spore which accompanies his description supports this view. In sculpture most of the spores of the Housel Bay plant agree very well with M. Corbière's figure, but they are rather variable; a few have the surface covered with numerous rather blunt and irregularly distributed papillæ, recalling those of *F. Mittenii* Tindall, while others, as pointed out to me by M. Douin, have somewhat the sculpture of those of *F. pusilla* (L.) Dum. *F. Crozalsii* clearly belongs to the group of *F. cæspitiformis*, with which it agrees in the vegetative plant. It is closely allied in spore sculpture to *F. Husnoti*, but it is essentially distinguished from this by the strong violet colouring of the rhizoids, which are brownish or hyaline in *F. Husnoti*. I also find that when the material dries off at the end of the growing-season the stem of *F. Husnoti* forms very definite tubercles vertically thrust downwards, while the thickened stems of *F. Crozalsii* lie more horizontally. The inflorescence of *F. Crozalsii* is probably heteroicous, as suggested by Müller, but some of the stems are clearly monoicous, as fruiting stems in cultivation have produced numerous antheridia in the autumn.

Fossombronia Husnoti var. *anglica* Nicholson. Moist heathy ground between Housel Bay and Kynance Cove. The plant was growing in very small patches, but it otherwise agrees well with that which I gathered at Babbacombe Bay (Journ. Bot. lii. (1914) p. 106). In this plant also the spores are considerably larger than they are in the typical *F. Husnoti* from the Continent.

Dichiton calyculatum (Dur. & Mont.) Schffn. A small gathering from moist earth on the trap rocks at Carbis Bay, with old and young perianths, one of which developed a young capsule on cultivation. This plant, which appears to be everywhere rare, is an interesting addition to the British hepatic flora. It was originally recorded from Algeria, but it has since been found in Dalmatia, Italy, and the South of France, while I have gathered it myself very sparingly in Southern Portugal. I append a description :—

DICHITON CALYCULATUM (Dur. & Mont.) Schffn. Monoicous. Plant small, 1–2 mm. long, dark or brownish green. Stem usually squarrosely branched with few rhizoids. Leaves small, distant, here and there wider and approximate, accrescent towards the perianth, where they are three to five times as large, closely imbricated, divided by a sharp-angled sinus to $\frac{1}{3}$–$\frac{1}{2}$ into two, frequently unequal, lobes. Underleaves rare, only present on stems bearing the ♀ inflorescence, lanceolate. Leaf-cells 15–18 μ towards the apex, marginal cells usually smaller, averaging about 12 μ, in the middle of the leaves 15–20 μ, roundish, somewhat incrassate, as are the cells of the bracts and perianth; the uppermost pair of the ♀ bracts connate, rarely the second and third pairs also. Perianth cylindrical, rather deeply 5-plicate towards the somewhat contracted mouth, half raised above the uppermost bracts; cells of the mouth roundish, incrassate. Seta 2–5 mm. long, formed of four rows of cells. Capsule oval, about 0·5 mm. long, divided into four red-brown lobes. Capsule-wall with cells in two layers; cells of the outer layer with knotty wall-thickenings, with semi-circular threads. Spores finely papillose, 9 μ in diameter, red-brown. Elaters elongate, 7 μ broad and 200–250 μ long with a double narrowly-twisted red-brown spiral. Male branch below the ♀ inflorescence, ♂ catkin short, bracts scarcely hollowed with pointed or obtuse, often toothed lobes, cell-walls less incrassate than in the rest of the leaves. Antheridia large, shortly stalked, single. Spores ripe in October. Gemmæ rare, angular with 5 or 6 points.

The above diagnosis is partially borrowed from that of K. Müller, and the description of the mature capsule, which I have not seen, is wholly taken from his. He speaks of the connection between the ♂ and ♀ inflorescence as being difficult to prove; but I did not find this the case with the Carbis Bay plant. Most of the stems had young ♀ bracts, and the short branch with the ♂ inflorescence was not infrequently easy to observe on the same stem.

The superficial resemblance of the plant to *Cephaloziella integerrima* (Linb.) Warnst. deceived for a time no less a bryologist than the late Dr. E. Levier, but the incrassate rounded cells of the present plant are different from those of the *Cephaloziella*. The bracts also are relatively larger and, the uppermost pair form an even more complete cup. *Dichiton* has generally been classed among the *Epigoniantheæ* as defined by Spruce, but M. Douin tells me that he places it in his new subfamily *Cephaloziellaceæ*, essentially characterized by the perianth with four to five folds and a seta with four rows of large external cells. When I first saw the plant at Carbis Bay in its immature state, I was strongly reminded of *Lophozia excisa* (Dicks.) Dum. by the colour and general appearance, and it is probable that the plant is often overlooked.

M. Douin has described (Bull. Soc. Bot. de France, vol. liii. p. 462) a closely allied species, *D. gallicum* Douin, differing principally from *D. calyculatum* in the presence of underleaves on the sterile stems, the larger less incrassate leaf-cells, and the perianth less contracted at the mouth.

Cephaloziella Massalongi (Spruce) K. M. This plant occurs in some quantity on the trap copper-bearing rocks at Carbis Bay. Growing near it and often intermixed with it is a plant with stouter stems, proportionately smaller leaves and much shorter underleaves with larger, smoother cells 12–15 μ and more, while those of *C. Massalongi* are 8–10 μ. M. Douin has distinguished this plant as a distinct species under the name of *C. Nicholsoni* Douin & Schffn. (Rev. Bry. 1914, p. 17). I was until recently inclined to regard it as a mere accidental form of *C. Massalongi*, but a further examination of the plant and of the conditions under which the two grow tend to prove the correctness of M. Douin's view. *C. Nicholsoni* affects rather drier and more exposed situations than *C. Massalongi*, and the differences in the characters, which appear to be very constant, are the reverse of what one would expect from the habitat. Unfortunately no ♀ bracts are present by which the validity of the species might be further tested.

Dr. K. Müller (Musc. Hep. Abt. ii. p. 193) does not accept the validity of *C. Nicholsoni*, but I find that this form is very scarce in the gatherings which I made at Carbis Bay in 1907, and it is possible that inadvertently none of the plant now recognized as *C. Nicholsoni* was included in the specimens which I sent him.

JAMES FORBES, F.R.S.

By James Britten, F.L.S.

In the biography of Forbes Watson by the late Canon Ellacombe, prefixed to the second edition (1901) of his *Flowers and Gardens*, it is mentioned that "on his father's side he was descended from James Forbes, F.R.S., (1749–1819), of Stanmore, who was a well-known student in Indian botany." A reference to our *Biographical Index* showed that his name was not included therein, but in the *Dictionary of National Biography* (xix. 397) is a somewhat full account of his eventful life. Born in London in 1749, he went out to Bombay in 1765 as a writer to the East India Company. After holding various important posts in India, he returned to England in 1784: "he had not only acquired a competency, but, being a good draughtsman and keen observer, had filled a hundred and fifty folio volumes (52,000 pages) with sketches and notes on the fauna, flora, manners, religions, and archæology of India." He resided in London, where he became acquainted with Banks and was elected F.R.S. in 1803; he had previously (1788) married the daughter of Joseph Gaylard of Stanmore, Middlesex, which was his headquarters for the remainder of his life. In 1796 he visited Italy, Switzerland, and Germany; the war then prevented him from entering France. In April 1803, during the peace of Amiens, Forbes went to Holland with his wife and daughter, and thence arrived in Paris the day after hostilities had been renewed and the English made prisoners. After seven or eight months, during which he seems to have enjoyed considerable liberty, he was sent with his family to Verdun—a place with which the present War has made us familiar: it may be mentioned incidentally that the collection of drawings at Oscott, to be referred to later, includes a large series taken by Forbes at this place. In June 1804 Forbes was allowed to return to England; he arrived at the end of July and settled at Stanmore, and devoted himself to the production of his *Oriental Memoirs* (4 vols. 4to, 1813–15), illustrated with numerous plates drawn from the sources indicated in the text and embracing the subjects already mentioned. After Waterloo Forbes went to France, where he remained for nearly two years; he then returned to England, but in 1819 again visited the continent; at Aix-la-Chapelle he was taken ill, and died on Aug. 1.

It was doubtless the (often excellent) coloured plates, from drawings by himself, in the *Oriental Memoirs*, and the numerous remarks on plants scattered through the work, that were considered to entitle Forbes to be described as "a student in Indian botany." A botanist in the strict sense of the word he could hardly be styled; but in the somewhat liberal estimate which entitles to a place in the *Biographical Index* he would seem to deserve inclusion therein; and the drawings themselves, of which I propose now to speak, tend to establish the claim.

Within a week of my first acquaintance with the *Oriental Memoirs* I was visiting Oscott College, the diocesan seminary for the Catholic Archdiocese of Birmingham. Passing through the library, my eye was attracted by a large volume open at a page on which I at once recognized the original of one of the plates I had lately seen. A party from some society at Birmingham had visited the College that afternoon and the volume had been brought out for their inspection; and to this circumstance I owe my acquaintance with the very remarkable collection of drawings of which this forms a part.

To these volumes Mr. J. G. Alger, the writer of the notice of Forbes in the *Dictionary of National Biography*, makes some reference, but his brief account contains many inaccuracies—it may, I think, be assumed that he never saw the volumes at Oscott, as he describes them as "quartos," they being in fact elephant folios, and their number as forty-two, whereas it was originally fifty. An account of the collection will be found in the Oscott Museum Catalogue (1880) and in an article on "The Forbes Collection" by the Rev. M. Williams, then a student at the College, in *The Oscotian*—the magazine of the College—vol. vii. pp. 55–73 (Easter, 1907). To these reference should be made by those who wish for a fuller and more accurate account of Forbes's work than the D. N. B. supplies: the following, from which it will be seen that there were *two* collections—a fact of which Mr. Alger was apparently ignorant—may be quoted, as giving in brief the history of the Oscott collection:—

"A careful distinction must be drawn between the two collections compiled by Mr. Forbes. The first one, the one we are now considering, consisted of fifty volumes and was presented to his daughter [who had married Marc Réné, Count de Montalembert, at that time serving in the British Army in India]; the second one, consisting of forty-two volumes, was the one compiled at the end of his life for his little grandson [who was to become, as orator and historian, a leader in the Catholic cause in France]. On the death of her husband, who at the time was French Ambassador at Stockholm, the Countess de Montalembert retired to Paris, taking with her the fifty volumes of her father's first collection; later on she returned to England, and died there in 1839. She bequeathed the volumes to her son Charles, and by him they were presented to the new College of Oscott, which had been opened in the same year." Mr. Williams proceeds to give an account of the collection, from which four volumes are unfortunately missing: "whether they were lost before or after the collection was presented to the College is not known."

The volumes of most interest to naturalists are the first thirteen, which contain transcriptions in a beautiful copper-plate hand of letters which had been addressed to friends and on which the *Oriental Memoirs* was subsequently (1813) based. In his preface to the first of these, which Mr. Williams prints in full, Forbes explains that the letters "were chiefly intended to elucidate the drawings which accompanied them"; the volumes were presented to his daughter—of whom a charming portrait is prefixed to vol. xiv.—on her twelfth birthday. For a general description of the contents of the remaining volumes the sources already indicated must be consulted.

The drawings of plants, with which alone I am concerned, are carefully coloured, and sometimes of considerable interest; thus in vol. ii. which is devoted to plants, there is a series (tt. 37–49) illustrating the Coco-nut Palm, which is shown in various stages of its development, and other trees of economic value are similarly treated. Economic plants, indeed, received a large share of Forbes's attention: in vol. vi. tt. 85–93 are occupied by figures of Peppers and tt. 29–51 of vol. xi. show various kinds of grain. The various changes of colour in the flowers of *Hibiscus mutabilis*, "the changeable Rose-tree," are figured on tt. 287–293 of vol. ii. In vol. xii. (tt. 181–189) is represented "the celebrated Banian Tree near Baroche, on an island in the

River Nerbudda. This single Tree contains 350 large Trunks, upwards of 3000 smaller stems, and measures 1800 feet in circumference." I have drawn up a list of the drawings, which I have correlated with the plates in *Oriental Memoirs* so far as they are therein reproduced. It seems hardly worth while to print this, but I have placed it in the Department of Botany with a copy of Mr. Williams's paper, in case any should wish to refer to it. The plates in the first edition (1813) of the *Oriental Memoirs* are scattered through the four quarto volumes; with the second edition, "revised by his daughter" (1834), issued in two volumes octavo, the plates appear as a separate folio volume (1835) "with explanatory notices."

Special mention, however, may be made made of vol. xiii., which is, from a botanical standpoint, the most interesting of the series. In 1776 Forbes visited the Cape, where he drew three Ericas, *Leucadendron argenteum*, and "a remarkable Flower which grows on the summit of the Table Mountain" (*Disa grandiflora*). These are in vol. ix. with a note which indicates that the numerous blank pages were intended to be filled with "drawings of Plants, Shrubs, Flowers, Sea-weed and other botanical subjects"; there is also a reference to St. Helena, of which he writes: "The trees on this island are called the Gum-wood, Ebony, Redwood, and a few others of little consequence, but whether they are indigenous or have been brought from other places I cannot learn." In 1789 he again visited the island, and in vol. xiii. (tt. 93–121), he figures the "Red-Wood or White Ebony" (*Melhania erythroxylon* Ait.), "a sprig of the Ebony-tree" (*M. melanoxylon* Ait.), "the Gum-wood Tree" (*Commidendrum robustum* DC.), "the String-wood Tree" (*Acalypha reticulata* Hook. f.), "the Wild Sedum or House-leek Tree" (*Sempervivum arboreum* L.), "*Stapelia variegata*, the Finger-Plant or Carrion-Plant," "*Stapelia hirsuta*," "*Lycopodium cernuum*, the Buck-horn Fern," "the Ground-Fern" (a *Lycopodium*), "the Seed-leaf Fern," "the Apricot-Peach," "the Velvet Thorn": these last I am not able to identify for lack of opportunity of comparison with specimens. Of these the most interesting is the *Sempervivum*. It is unrecorded from St. Helena, and may of course have been introduced; but it will be noticed that Forbes specifies it as "the *wild* Sedum," and we have in the National Herbarium a specimen from St. Helena collected by Banks and Solander in 1771, which stands in their MS. list without the indication "Hort." or "Cult." by which cultivated plants are usually distinguished. The only printed indication of any *Sempervivum* on the island is the comparatively recent one in Melliss's *St. Helena* (1875): "S. sp. (?) Yellow-flowered Crassula: cultivated and rare, in gardens on the upper land. Hab. Canaries."

Although his observations are mainly connected with his foreign travel and residence, there are indications that home objects also received Forbes's attention. Vol. xliii. contains a miscellaneous collection of "Birds, Insects, Flowers, and Fruit" in which we find—the folios are not numbered—*Hippophae*, "a plant which grows wild on the sand hills near Sandown Castle," Isle of Wight (1801); a series of drawings of British fruits; three Agarics from "the Angus hills"

(1799) a Chantarelle, "drawn from nature at Mont Bois in Angus"; and numerous garden flowers, including a Passion-flower drawn by Eliza Fothergill in 1797. Occasionally the time occupied on the drawing is noted: thus a white Fritillary took 40 minutes.

The whereabouts of Forbes's second collection of forty-two volumes prepared for his grandson does not seem to be known. It would appear from a reference in Mrs. Oliphant's *Memoir of Montalembert* (i. 10) that it was in Montalembert's library when he was living at Stanmore, and that she saw it there as she transcribes Forbes's dedication—"To Charles Forbes Montalembert," dated "Brighthelmstone, 1 Jan. 1811." I do not know what became of the library and so am unable to trace the collection.

A charming watercolour portrait of himself by Forbes is framed in the library at Oscott.

LONDON PLANTS.

The recently published volume (for 1915) of the Transactions of the London Natural History Society contains two interesting papers on "The Botany of the [London] District," by C. S. Nicholson, F.L.S., and on "The Flora of Epping Forest," by R. W. Rogers. The former is more especially concerned with Middlesex plants, and mainly with their extinction, which would seem to be progressing at a rapid rate. In *the Flora of Middlesex* (1869) a list of 58 species was given as in all probability extinct, and to these Mr. Nicholson thinks 79 must now be added, of which he gives a list. It must however be remembered that in Trimen's list were plants which could never have been regarded as native in Middlesex, and the same may be said of Mr. Nicholson's, which we append, and which will be seen to contain such plants as *Corydalis solida*, *Archangelica*, *Centaurea Jacea*, *Antirrhinum majus*, *Verbascum Blattaria*, *Narcissus biflorus*. As to the rest, although none of the members of the Society have succeeded in finding any of them, it does not we think follow that all are actually extinct. Readers of this Journal will remember that the late Mr. Benbow found at Harefield plants which appear in *The Flora of Middlesex* as extinctions: Mr. Rogers in his paper is, as we shall see later, more cautious. Mr. Nicholson's list is as follows:—

Myosurus minimus.
Ranunculus circinatus.
R. parviflorus.
Corydalis solida.
Fumaria capreolata.
F. micrantha.
Turritis glabra.
Teesdalea nudicaulis.
Dianthus deltoides.
Sagina ciliata.
S. subulata.
S. nodosa.
Alsine tenuifolia.
Geranium rotundifolium.
Erodium moschatum.
Radiola Millegrana.
Medicago denticulata.
Vicia lathyroides.
Spiraea Filipendula.
Myriophyllum verticulatum.
M. alternifolium.
Sedum dasyphyllum.

Parnassia palustris.
Sium latifolium.
Bupleurum tenuissimum.
Œnanthe Lachenalii.
Œ. silaifolia.
Archangelica officinalis.
Sambucus Ebulus.
Valerianella carinata.
Scabiosa Columbaria.
Inula Helenium.
Pulicaria vulgaris.
Centaurea Jacea.
Carduus pratensis.
Campanula Trachelium.
Cuscuta Trifolii.
Cynoglossum officinale.
Lithospermum officinale.
Myosotis repens.
Orobanche rapum.
Verbascum Blattaria.
Antirrhinum majus.
Limosella aquatica.
Pedicularis palustris.
Mentha rotundifolia.
Mentha piperita.
Marrubium vulgare.
Centunculus minimus.
Samolus Valerandi.
Littorella lacustris.
Paris quadrifolia.
Orchis incarnata.
Habenaria chlorantha.
Ophrys muscifera.
Spiranthes autumnalis.
Narcissus biflorus.
Tulipa sylvestris.
Fritillaria Meleagris.
Allium oleraceum.
Colchicum autumnale.
Luzula Forsteri.
Alisma ranunculoides.
Scirpus palustre.
Triglochin palustre.
Scirpus carinatus.
Blysmus compressus.
Carex pulicaris.
C. disticha.
C. divisa.
C. strigosa.
C. laevigata.
Avena fatua.
Koeleria cristata.
Sclerochloa distans.
Lastrea spinulosa.
Polystichum aculeatum.
Lycopodium clavatum.
L. inundatum.

Perhaps Mr. Williams, who has for some years been working at Middlesex plants, may be able to show that some of these are still entitled to a place in the flora.

Mr. Nicholson writes: "Even within our own time many well-known localities have been lost, and Highgate Woods, which thirty years ago were a blaze of colour in spring, are now so intersected by cinder and asphalt paths that their beauty has been almost destroyed. Blue-bells are practically non-existent, and the thousands of wood anemones are now represented by a few miserable clumps of leaves here and there. The better drainage of the woods has destroyed numerous plants, and several fine clumps of such plants as *Carex pendula* and *Carex vesicaria* have been lost. Bishop's Wood, too, in Hampstead, is being rapidly spoiled, and within the last twenty years the famous alder copse at Whetstone has been converted into builder's land. The acquisition of Hampstead Heath for public use has now practically extinguished its interest as a botanical area."

Mr. Rogers's paper on the Epping Forest flora is of greater general interest, as he has evidently carefully studied not only the plants of the district but the circumstances under which they occur. The types of plant habitats within the Forest boundaries are three:—

"(1) The damp woodland on clay, occupying the whole of the wooded area south of High Beach, and the stretch north of Epping known as the Lower Forest. The principal trees are oak and hornbeam, with an undergrowth of hawthorn, blackthorn, and much bramble.

"(2) Dry woodland on sand and gravel—the wooded district between Fairmead Plain and Epping. The chief trees are beech and birch, and the undergrowth is comparatively sparse.

"(3) Open heathy ground on the sand, interspersed throughout the drier and more elevated ground."

Comparing his observations with the lists given in E. N. Buxton's *Guide to the Forest*, he notes that of the 436 species therein enumerated, about 70 are unknown to him, either personally or by report, as of actual occurrence: among them *Teesdalea nudicaulis*, *Parnassia palustris*, *Cerastium quaternellum* and *arvense*, *Saxifraga granulata*, both *Chrysospleniums*, *Serratula tinctoria*, Dodder, Mullein, *Pedicularis palustris*, *Mentha Pulegium*, Vervain, *Littorella lacustris*, Herb Paris, *Spiranthes autumnalis*, and Juniper.

"On the other hand," he continues, "I have a list of about 25 species I have observed myself, which are not included. Nine of these are rushes or grasses. One or two, like the Ragged Robin (*L. Flos-cuculi*), are obviously oversights, but perhaps *Veronica scutellata*, *Valeriana dioica*, and *Limnanthemum peltatum* were never observed by Mr. Buxton's recorders."

Then comes the caution to which we have referred, which seems amply justified by the facts which follow:—

"One hesitates to say that species not recently found are now extinct in the Forest, especially if they are such as would naturally be looked for there. I have had several quite unexpected finds in recent years. About six years ago, with another member of the Society, I was in an out of the way corner of the wood, not far from Epping, when we were delighted to find in a moist glade a grand clump of the uncommon Marsh Fern (*Lastrea Thelypteris*), whose creeping roots had covered quite a large area, throwing up, perhaps, hundreds of fronds. In the grassy sides of this glade the Marsh Valerian (*V. dioica*) was in flower, and about a hundred yards away we found a strong colony of the Bogbean. These three species were quite new to us in the Forest. Some years ago on an excursion of the Society, a small clump of Whortleberry was found on the high ground near the 'Wake Arms.' I have never seen it since. Two stations for the Lily of the Valley are known to me, and probably to many other members. A plant of Solomon's Seal near Chingford was quite an unlooked-for find. And not far from the 'Wake Arms' two or three clumps of the strange Birds'-nest Orchis still throw up their pale brown spikes year by year among the decaying beech leaves."

The following paragraphs may be quoted as examples of the interesting observations which render the paper worthy of attention:—

"The large group of aliens, now such a considerable feature in the flora about London and other large centres of population, is almost entirely absent from the Forest. Taking an 'alien' to be a species which though now spontaneous, originated in Britain through human agency, it is of course probable that many of the group just referred to may be of alien origin. But they are the colonists who have found in their new home a congenial soil and climate, and have maintained themselves, with the assistance of cultivation, so long that the history of their introduction is not now traceable. Their obvious inability to hold their own, in competition with the native flora of primitive unbroken ground like the Forest, is a strong presumption of their foreign origin, however. But among aliens of recent introduction we are unlikely to find many species of sufficient adaptability to secure their position. Those capable of colonisation have mostly gained their place long ago. Therefore, within the Forest area, where cultivation and disturbance of the soil have fortunately ceased, very few of the modern casuals are likely to survive their first year.

"Among the undoubtedly native and widely spread sylvestral and ericetal species, there are a few so sparingly represented in the Forest flora that one imagines there must be some special reasons for their scarcity. In some cases the reason is obvious. There is a story, likely enough, that the Hazel was rooted out to prevent the disturbance of the King's deer by nutting parties from London. The proximity of London is also doubtless accountable for the disappearance of so striking a plant as the Foxglove, and the Primrose has almost met the same fate; though it must be remembered that the Primrose is a plant of damp woodland, and was probably always scarce in the main block in the Forest, between Fairmead Plain and Epping. In the damp Lower Forest beyond Epping it is still plentiful enough. But the same cause can scarcely account for the almost total absence of the Woodruff, the Wood Spurge (*Euphorbia amygdaloides*)—which is common enough in Hainault a few miles away—the inconspicuous moisture-loving Chrysosplenіums, and the two woodland grasses, Milium and Melica. Again, why is the Purple Heather entirely confined to a few spots on the gravel near Snaresbrook? The sandy ground about High Beach and the 'Wake Arms' would seem to be quite suitable for it. On all the expanse of heather and gorse-clad common the parasitic Dodder is, so far as I am aware, quite absent. Even the little Germander Speedwell is remarkably scarce, and though its flowers are bright enough it is hardly likely to have been uprooted as has the Primrose. Is it possible that the nearness of London has reacted on some of these species through the pollution of the atmosphere, which is often only too evident? I think there is no doubt that the scarcity of lichens on the Forest trees is largely due to this cause."

In addition to those already mentioned, the following are named by Mr. Rogers as among the most interesting species still to be found in the Forest:—

"*Drosera rotundifolia* is scarce, but by no means extinct on moist peaty ground near the 'Wake Arms.' *Hypericum elodes* occurs in some of the northern bogs. *Limnanthemum peltatum*, perhaps the rarest British species in the Forest, is well established in a large pool near Ambresbury Banks. *Rhamnus Frangula* is to be found near the Eagle Pond, Snaresbrook: *R. catharticus* near the Connaught Waters. A few trees of *Pyrus torminalis* are scattered through the woodland. *Campanula hederacea* is a western and northern species, but has an outlying station in the Forest between Theydon and Loughton, in damp grassy hollows, often associated with *Anagallis tenella*. *Daphne Laureola* is still found (very sparingly) in thickets round Fairmead. *Epipactis media*, the Helleborine, is another orchid common in the Lower Forest, and occasionally found elsewhere."

The volume also contains the minutes of the proceedings at the fortnightly meetings of the Society, and an "interim report of the Botanical Committee for the Southern Portion of the Districts" which has in view the compilation of a list of the existing flora, no records prior to 1913 being accepted. We presume the specimens are submitted to some authority for confirmation.

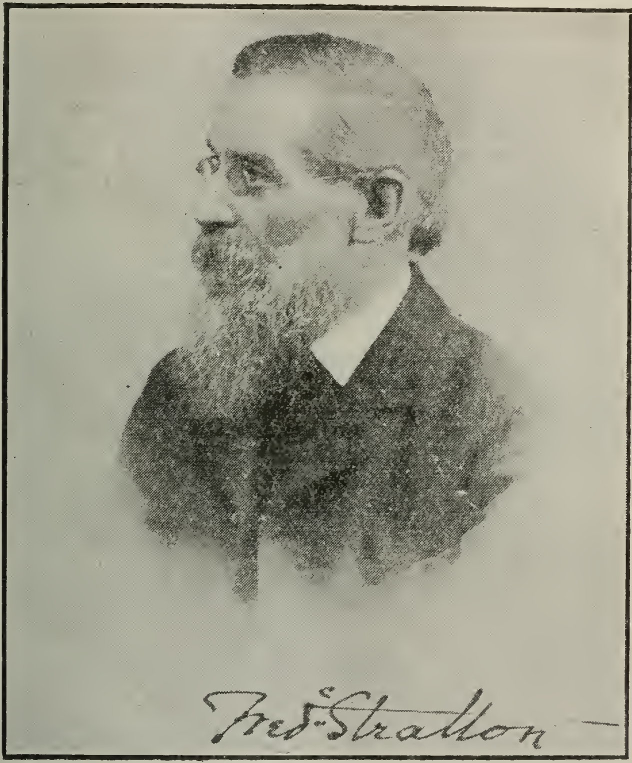
FREDERIC STRATTON
(1840–1916).

The death of Frederic Stratton, which occurred on December 5th at his residence at Newport, Isle of Wight, has deprived this Journal of one of its earliest subscribers and contributors. His first "Notes on Isle of Wight Plants" appeared in November 1869, in which year he was elected a Fellow of the Linnean Society; his last in the issue for December last, which, owing to the difficulties which prevailed throughout the year, did not appear until after his death—it may be cited as an instance of his interest in the Journal that shortly before this he asked whether it had arrived.

Stratton spent the whole of his life at Newport, where he was born on November 16, 1840 and where he held various appointments, including that of clerk to the Board of Guardians, a position which he filled with ability for nearly forty years, retiring in 1903. He was admitted a solicitor in 1863, and practised until about two years ago. He was deeply interested in church matters, which he viewed from the "Low Church" standpoint, especially in the work of the Church Missionary Society: he was a member of the Winchester Diocesan Conference and an active worker in connection with St. John's Church, Newport, of which one of his sons, the Rev. Arthur Carruthers Stratton, was at one time vicar. This name indicates the intimate friendship which existed between Stratton and Mr. William Carruthers: it was in the Department of Botany—when the latter was Keeper and Trimen, also a friend, an assistant,—when it was still at Bloomsbury, that I first met Stratton. He was also a friend of A. G. More, who acknowledged his help in the "Supplement to the *Flora Vectensis*" published in this Journal for 1871.

Apart from our botanical relations, which were always cordial, I did not know Stratton intimately: but I remember walking to Newport from Weston one hot summer's day many years ago, arriving in a footsore condition which evoked the hospitality of Mr. Stratton and afforded me a glance of his happy family life. He always impressed me as a thoroughly good man, equable in disposition, always ready to be helpful and kind, especially to beginners in botany.

Having resided all his life in one place, and being a keen observer, Stratton had always an exceedingly intimate knowledge of its botany: as his notes in this Journal, extending as they do over forty-five years, have shown, he was however constantly adding to his information: although not critical on any particular genus, he was, as his notes show, an extremely careful observer, and the specimens which he distributed were always excellent. Apart from his contributions to this Journal, Stratton published very little: in 1900 he issued a little pamphlet for the benefit of visitors to the Island on the *Wild Flowers of the Isle of Wight*, in which the principal species of various localities are enumerated: in this he expressed "a hope of publishing a Flora of the Island," but this hope was never fulfilled. Not long before his death he had proposed to go through his herbarium, extracting such notes as seemed worth publication: but this also was not carried out.



Fredc Stratton

Stratton was a man of cultivated tastes; he painted both in oils and water-colours, and was a constant exhibitor in connection with the Isle of Wight Fine Arts Society. He spent many holidays in Switzerland—the first, I believe, with Trimen and Mr. Carruthers,—and lectured on these and other subjects. A paragraph from *The Isle* *of Wight County Press* for December 9, which contains a warm tribute to Stratton's many virtues, may fittingly conclude this notice:—"Enjoying the warmest regard and esteem, not to say affection, of a wide circle of friends, who admired the high standard of character which he set in every department of life and were charmed by his many excellent personal qualities, he has passed to his long rest full of years and honour, and the Island is the poorer for his loss."

JAMES BRITTEN.

SHORT NOTES.

HELLEBORUS VIRIDIS (Journ. Bot. 1916, 338).—For many years I grew this plant and many coloured hybrid Hellebores. They all acted in the way Mr. Thompson describes. I found I could prevent the drooping and fading by cutting the stalks under water, splitting them up, and immediately placing them in water. I attribute the drooping and fading to the transpiration being much more rapid than the absorption, owing to the current of water in the xylem of the vascular bundle being diminished by exposure of the bottom of the cut stem to the air. The balance of absorption and transpiration is further upset by the plant when cut being brought into the dry air of a room from the more or less saturated air out of doors. During my long experience of cut flowers in connection with my drawings, I have found that if a plant immediately after being cut is put into a tin box well filled with leaves, their transpiration soon saturates the air and thus stops much transpiration in the plant sent. The result is that plants so packed will remain fresh in the tin for many days. If, on the other hand, a plant is packed in a cardboard box or wrapped in paper the box or paper acts as an absorbent and transpiration is thus promoted rather than checked and the plant arrives drooping and faded. It is for this reason that I urge my correspondents to use tin boxes and to fill them, if the plants do not already do so, with suitable leaves.—E. W. HUNNYBUN.

LILIUM MARTAGON.—Several years ago, in early spring, Dr. Walter Gardiner and I discovered a fine patch of *Lilium Martagon* near Tintern, on the Gloucestershire side of the Wye; but, hearing that the habitat was already known, we thought little more of the matter. Last summer, however, when spending the day at Tidenham with the Rev. Walter Butt, Mr. H. H. Knight and I went to the woods to see the plant in flower. We were much pleased to find that Mr. Butt's station was some quarter of a mile or more from that mentioned above, and also to meet with scattered plants of the Lily as we pushed through the woods in the direction of Tintern. Dr. Gardiner and I had also come across a fair number of specimens on the hill-slopes below our main patch; while Mr. Butt told us that he had seen one or more near the Wynd Cliff, on the other side of the Wye. Thus *L. Martagon* grows here and there in the river-side woods—say in six spots—besides in two patches of some fifty yards in diameter on the upper part of the slopes. These facts, which do not seem to have been published, have a considerable bearing of the status of the Lily as a native. It certainly has no appearance of an alien; while the Wye-side woods are wild and ancient.—A. H. EVANS.

SAGINA MARITIMA G. Don.—The authorship of this species is wrongly attributed to D. Don in the *Index Kewensis*, and the error has been repeatedly copied both in England and on the Continent. It was first published in 1806 by George Don, senior (1764–1814)—the father of G. Don, junior (1798–1856) and of David Don (1800–1841)—in his *Herbarium Britannicum*, fasc. vii. no. 155, with the following description, in which I have corrected the numerous misprints of the original:—"*Sagina maritima.* Annua; Fl. Maio–Augusto. Radix parva; caules plurimi, adscendentes, plerumque divaricati, dichotomi. Foliis lineari-lanceolatis, obtusis, carnosis, nitidis, apice submucronulatis. Calyx ovatus obtusus, margine scarioso. Petala minuta, sæpe abortiva; stamina 4 ad 8. A *Sagina apetala* foliis latioribus, obtusioribus, crassioribus, sub lente hispidis, vix aut ne vix quidem mucronulatis, calycis foliis ovato-obtusis plane differt. On the sea-coast not infrequent in Angusshire, Isle of Skye, near Aberdeen, Queensferry, and Edinburgh."—C. C. LACAITA.

[Don's uncorrected description was published by Mr. Druce in his paper on "The Life and Work of George Don" (Notes R. Bot. Gard. Edinb. iii. 170), but, as has been pointed out in this Journal (1888, 235), the species was first distinguished and named by Robert Brown, whose specimens, from his own herbarium, are in the Department of Botany. The MSS., which, as there stated, I was fortunate enough to find and to present to the Department, have now been bound in one volume, paged and indexed: Brown's very full description of the plant, to which the label attached to his specimens refers, will be found on pp. 793–4.—JAMES BRITTEN.]

PUCCINIA HYPOCHŒRIDIS.—Mr. W. B. Grove in his *The British Rust Fungi*, p. 149 (1913), states concerning this species that "only uredospores were seen in British specimens." He describes the teleutospores as "delicately verruculose-punctate (?)," and in a footnote remarks:—"The alleged punctations of the teleutospores were invisible in all the specimens I have seen." In October last I gathered at Oxshot some leaves of *Hypochœris radicata* on which this *Puccinia* was present chiefly in the uredospore stage: amongst the uredospores, however, in some cases were mixed a few teleutospores. These were clearly punctate, the punctations showing best in lactic acid—the wall of the uredospore is echinulate. The size, shape, etc., of the teleutospores agree with Mr. Grove's description.—J. RAMSBOTTOM.

REVIEWS.

The Thirty-Second Annual Report of the Watson Botanical Exchange Club, 1915–16. Cambridge: Webb & Co., 1916.

FROM the preliminary note of the Distributor, Miss Ida M. Roper, with which the Report begins, we learn without surprise that there has been a falling-off in the number of specimens submitted; but the liberal contributions of some of the members have brought the number up to 2963. The notes upon these contain, as always, much matter of interest to British botanists, a few items of which we propose, as is customary, to extract for the benefit of our readers. A large number, however, relate to critical genera, and for these—*Viola*, ***Rubus***, ***Rosa***, *Euphrasia*, *Carex*, and the like—reference must be made to the Report itself.

A few points for criticism suggest themselves as we turn over the pages. *Barbarea vulgaris* var. *divaricata* is incorrectly cited as of "Dyer": it was published (not as a variety, but as a form) in the *Flora of Middlesex*, p. 29 (1869) by Trimen and Dyer, who should be cited jointly to any new name published therein. The rule which prevails in the National Herbarium as to not printing names existing in MS. but not published might with advantage be generally observed; such publication seldom serves any useful purpose and needlessly increases synonymy: a name "suggested" for the plant just referred to, but hitherto unpublished, might well have remained unrecorded.

The notes under *Erophila* and *Capsella* suggest that the distinctions in the forms of these are somewhat slight and that opinions differ widely concerning them: we doubt whether Mott's varietal names *stenocarpa lyrata* and *stenocarpa coronopifolia* (under *C. Bursa-pastoris*) can be recognized as valid, although we note that the Report inserts in each case a hyphen which is not in the original publication. The question as to what is sufficient to constitute a variety, nameable as such, arises in connection with the yellow-fruited form of *Viburnum Opulus* named "var. *flava* mihi" by Mr. Horwood. The form seems permanent in the locality given, but, apart from the colour of the fruit, the plant appears to present no other distinctive characters of importance, and the occurrence of "distinctly intermediate" specimens with "light red and yellow fruit" in the same locality suggests that the plant is hardly entitled to varietal rank.

We are a little inclined to doubt whether it is worth while to print all the contradictory opinions of experts; this, however, has the advantage of stimulating the tyro to individual investigation, although it must shatter his confidence in those whom he has been accustomed to regard as authorities. Some of the divergencies—*e. g.* under *Erophila* and *Euphrasia*—arise from the fact that in the same gathering more than one species was represented, and that the plants sent to experts were hence not identical. As to *Euphrasia*, we hope shortly to publish a study of the British species by Mr. Cedric Bucknall which will, we think, prove of great assistance to students of this difficult genus.

We note with satisfaction the absence of rubbish-heap botany, the few aliens included being such as present points of botanical interest such as are given by Mr. Wilmott in his note in *Anchusa officinalis*. There are indications that the importance of cultivation as a test of the value of critical forms is becoming recognized.

The following are the items we have selected for quotation:—

Ranunculus tripartitus DC. (*fide* Dr. Moss).—Near Brockenhurst, New Forest, S. Hants, v.c. 11, flowers April 16, fruit May 19, 1914.—R. S. STANDEN. Though the aerial leaves sometimes resemble those of *R. tripartitus*, I should refer this, and all the other New Forest plants I have seen, to *R. lutarius*. *R. tripartitus*, which occurs in Cornwall and Co. Cork, may be readily distingushed by the production of a number of very finely divided submerged leaves, the segments of which are capillary. *R. lutarius*, on the other hand, rarely produces any divided submerged leaves, and when these are present they are few in number, less frequently forked, and have the segments distinctly flattened. Usually there are also some transitional leaves present, and these I have not seen in *R. tripartitus*.—J. GROVES.

Viola hirta L., f. *lactiflora* Reichb. Cadbury Ridge, Tickenham, N. Somerset, v.c. 6, April 22 and Aug. 26, 1915. Flowers pure white.—IDA M. ROPER. This plant is not the counterpart of the one found on Cadbury Camp, in the same district. Its surface is much more hairy; its flowers are smaller, with much thinner narrower petals; its fruit is furnished with long shaggy hairs. The same form grows sparingly in Banwell Wood, Somerset, and at Stokeinteignhead, Devon. In 1914, Miss Livett very kindly sent me an assortment of *variegata* and *lactiflora* forms from Cadbury, so that I might study the capsules. I found all *variegata* capsules to have long, shaggy hairs on the angles; some *lactiflora* capsules were glabrous (as described in *British Violets*, p. 24); some were slightly hairy, but *not shaggy*. The name I applied to this form from Banwell Wood and Stokeinteignhead is:—"*V. hirta*, var. *hirsuta*, f. *lactiflora*." Miss Roper's specimens—taken in flower, and again in fruit—make violet-study a pleasure.—E. S. GREGORY.

V. Lloydii Jord., var. *insignis* Drabble. Abundant in oatfields, Melvich, W. Sutherland, v.c. 108, July 15, 1915. Named by Dr. Drabble. This beautiful pansy is common on the North coast, in cultivated land; but it is also probably native, as I saw it in wild ground near Strathy and Altnaharra.—EDWARD S. MARSHALL.

Rubus caeresiensis Sudre & Gravet, subsp. or var. *integribasis* Rogers. This is the plant represented in "Lond. Cat.," ed. x., by No. 444, "*integribasis* P. J. Muell.?"; .... The alteration of name suggested above is due to Dr. Focke's change of view. It was at his suggestion that we adopted the name *R. integribasis* P. J. Muell. (see Journ. Bot. 1890, p. 100); but now [see his Sp. Ruborum (Rubi Europæi) 1914, pp. 330, 331 (106, 107)] he associates our plant more closely with Sudre & Gravet's *R. caeresiensis*. His words (p. 330) are: "*R. integribasis* (cit. P. J. Muell.) Rogers 'Handb. Brit. Rubi,' p. 24, forma *R. caeresiensi* arcte affinis videtur"; and he adds (p. 331) "in plantâ Britannicâ (*R. integribasi* Rogers) foliola potius obovata, aculei paullo longiores et robustiores sunt. Stamina stylos superant. Petala roseola. *R. caeresiensi* sine dubio magis affinis quam *R. integribasi*. In sudlichen England." I have not seen *R. caeresiensis*, which is reported only "in den belgischen Ardennen."—W. M. ROGERS.

Saxifraga Sternbergii Willd. Hort. "Caradon," Southampton, Hants, May 30, 1915. Originally brought two years ago by Mr. Arnold Eliott from Brandon Head, Co. Kerry, and transplanted in Sept. 1914, to a fresh rockery.—H. S. Thompson. This closely approaches the County Clare plants so named (Black Head and Ballyryan); but typical *S. Sternbergii*, as figured by Sternberg from his original cultivated plant, differs greatly, and I rather doubt whether they can be specifically identical. I have in cultivation a Saxifrage, from near the summit of Brandon Mountain, which exactly agrees with Sternberg's figure of his cultivated plant; it is likewise bright green, but the petals are broader and rounder, never pinkish (as in the present case); the sepals broad and obtuse; the leaf-segments broad and blunt: so that it comes much nearer to *S. rosacea* Moench (*decipiens* Ehrh.; *palmata* Sm.) in characters, though clearly distinct from that. In a wild state it is densely cæspitose; under cultivation it becomes somewhat laxer, but less so than in the Clare and Brandon Head examples.—E. S. Marshall.

Galium verum L., var. *maritimum* DC. Sandy shore, Fairbourne, near Barmouth, Merionethsh., Aug. 4, 1915.—W. C. Barton. This is, I think, what has been so named in Britain; but it does not quite agree with the description in De Candolle's '*Prodromus*,' iv. 603:—"caule demisso ramosissimo basi glabro apice villoso, ovariis glabris," the stem not being villous, upwards. It may be the var. *littorale* Brébisson; but it is probably a state, due to poor sand and exposure, rather than a real variety.—E. S. Marshall.

Anagallis arvensis L., var. *carnea* Schrank. Barmouth, Merionethsh., Aug. 18, 1915. Petals with glandular ciliate margins. The scarlet-flowered plant was plentiful, but I saw none with blue flowers in the district. The pale-flowered form occurred chiefly on roadsides, trodden ground or poor stony soil, and a few were intermediate in colour.—W. C. Barton.

Scutellaria galericulata L. [In answer to a question by Mr. W. C. Barton, whether the form with glabrous leaves and calyxes (*α. vulgaris* Mutel.) is found in the British Isles, Mr. Arthur Bennett writes:] "Yes. I have a specimen gathered by myself between Alford and Cranleigh, Surrey, Aug. 1884." Another from "Gatehouse, Kirkcudbright, July 1887, Prof. D. Oliver," comes very near to it, but is really slightly hairy. A specimen from "Andover, N. Hants, July 18, 1878, C. B. Clarke," is intensely hairy, so much so that the corollas, calices, and under surface of leaves are quite whitish with the density of the hairs. Mr. Barton's observation that "the pubescence (of his specimens) is not due to dry or exposed situation" is apt, because in the case of *Teucrium Scordium* L. it is so, as the Devon specimens are usually very hairy, while others from near Ely, growing in water, are nearly glabrous. But there is another agent to consider; *i. e.*, age. In *Vicia Orobus* the plants are densely hairy up to the buds of the flowers showing, they then gradually become semiglabrous as the flowering and seeding proceed.

Potamogeton crispus × alpinus. River Earn above Dalreoch Bridge, Mid Perthsh., Sept. 22, 1915. This hybrid was discovered by Mr. J. R. Matthews and myself whilst botanising on the bank of the river Earn above Dalreoch Bridge, nearly opposite the village of Dunning, on the 26th Aug. last Not being able to identify it, I sent specimens to Mr. Arthur Bennett, who determined it to be the above hybrid, saying at the same time that it has hitherto been found only in Denmark, and possibly in Bavaria. There were two or three distinct beds of it, and on a subsequent visit another was found about a mile below, on the opposite (left) bank, a short distance below the bridge.—W. Barclay.

Ammophila baltica Link. Sand dunes north of Yarmouth, E. Norfolk, June 26, 1915. The last edition of the Lond. Cat. treats *A. baltica* as an undoubted hybrid of *A. arenaria*; .... The status of *A. baltica* was presumably determined in Northern Europe, where possibly it occurs in company with both its reputed parents. In this country, however, on the coast of Norfolk at least, Mr. C. E. Salmon and I have, during the past summer, carefully noted the range and associations of *A. baltica*, without perceiving anything suggestive of a hybrid origin, and we did not meet with a single plant of *Calamagrostis epigeïos* whilst botanising in the county.—J. W. White.

The Anthocyanin Pigments of Plants. By Muriel Wheldale. University Press, Cambridge, 1916. 15*s.* net.

The botanist of mature years, as well as the younger investigator of plant chemistry, will read this well-constructed book with real interest. The latter will find brought together in a masterly way the multitudinous facts and hypotheses relating to the anthocyanins; the former will perceive a remarkable illustration of the change in attitude which the botanist has assumed during the past decade. For in bringing together facts old and new and in disinterring ancient errors, with respect to some of which this reviewer himself admits guilt, Miss Wheldale designedly or undesignedly, but in any case effectually shows that the fashion of guessing at meanings has given place to the custom of discovering processes. In the older day we were happy at playing the guessing games of biology: content if we were able to say that the anthocyanin pigment of a flower served the purpose of attracting insects, that a similar pigment in a leaf was useful in making it warm or keeping it cool or acting as a sunshade to chlorophyll: and so we passed on, "in maiden meditation fancy free" to guess again about the biological things. Unless he be very mature indeed, the botanist who years ago took part in these pleasant games must admit that the newer sterner attitude to biological phenomena is more worthy of the serious attention of scientific workmen, for it is better to find out what things are than to guess as to their uses.

In the case of the anthocyanin pigments their nature and provenance are peculiarly well worth discovering; for the reason that the Mendelians have shown that these pigments are inherited in strictest fashion and that they are controlled by other hereditable reagents—paleifiers which make the colours faint, intensifiers which give richness to their tints, and inhibitors which suppress them altogether. So if knowledge of the chemistry of these pigments can catch up with our knowledge of their inheritance we may hope to discover something of the nature of the reagents of heredity.

This chemical knowledge is accumulating rapidly. We know that the mother substance of the anthocyanin pigment is a flavour. There is evidence that either oxidation or reduction or both are concerned in the production of the pigment, and if we accept Willstätter's and Everest's conclusions we must regard the pigment, *e. g.* in the Cornflower, as a glucocide. In the free state it is purple, in the presence of acids it yields a red pigment, and when it forms a salt with an alkali—with potash for example—it becomes blue.

It is not, however, easy to reconcile Willstätter's conclusions with all the known genetical or even chemical facts; but, on the other hand, it is not impossible to form a mental scheme which might harmonize them. Assume that the anthocyanins are produced in special "vacuoles," and assume further that the fundamental purple pigment escapes from these vacuoles into the cell-sap. Then if the sap be rich in organic acids the purple will change to red; if, on the other hand, the sap contains a large amount of potassium salts the purple will change to blue. In support of an hypothesis—which it should be stated must be charged upon the reviewer and not on the author—it may be mentioned that Pick, or some other contemporary of the present writer, published evidence in support of this "special vacuole" cloistering of anthocyanin pigments, and, moreover, in early stages of petal formation in the Chinese Primula, the anthocyanins may be seen as small droplets sharply marked off from the general sap.

Such an hypothesis would, moreover, help to explain the curious facts of correlation between colour and constitution: the association in Stocks of hoariness of leaf with colour of flower, the superiority in flavour of yellow over red-skinned tomatoes, the weakliness of certain albinos and the coarse flavour of red as compared with ordinary cabbages. Evidently colour is but an outward sign of an inward grace.

Miss Wheldale has performed a laborious and difficult task with remarkable skill and judgement. Although she herself has done much to elucidate the genetical behaviour and chemical nature of the anthocyanins, she has, nevertheless, brought to her work a detached and judicial mind. As a result her pages do not smell of the laboratory nor savour of specialized pedantry: and what praise higher than this can be bestowed on records of contemporary research?

F. K.

BOOK-NOTES, NEWS, Etc.

At the meeting of the Linnean Society on November 16th, Dr. B. Daydon Jackson gave an account of the *Codex Aniciæ Julianæ* in the Imperial Library at Vienna, of which a copy in collotype was lately presented to the Society by Sir Frank Crisp. Pedanios (or Pedakios) Dioscorides was born at Anazarba in Cilicia, and received his education at Tarsus and Alexandria. Details of his life are wanting, but it seems certain that he was physician to the Roman legions, and accompanied them into nearly every country on the north of the Mediterranean. He was a contemporary of Pliny the elder, living under the Emperors Nero and Vespasian, and dying about A.D. 77. His five books on Materia Medica seem to have suffered at the hands of editors, and it is usual to find two additional books tacked on which are obviously not the work of Dioscorides. The text, even in the earlier MS. known, seems to be derived from still earlier sources, possibly taking shape about the close of the 3rd century. The celebrated *Codex Aniciæ Julianæ* is stated to have been written about A.D. 512, though freely ascribed to 40 years earlier (472). It was acquired by Busbecq, Austrian Ambassador to Turkey, and finally reached Vienna, where it now is. A later *Codex Neapolitanus* is also preserved in the Imperial Library at Vienna, but of about the 7th century. In 1763–73, engravings from the Viennese *Codex Neapolitanus* were prepared by the Librarian, Gerhard Swieten, the botanic portion under the care of Baron N. J. Jacquin. In March 1764, a set so far as engraved was sent to Linnæus for his advice; they were to be guarded carefully and shown to no one. The work was stopped at or soon after Swieten's death in 1772; four copies are known, two are at Vienna: the best copy has 410 figures, 1–383 are from the *Codex Neapolitanus*, 384–410 from the *Codex Aniciæ Julianæ*: the second copy has only 407 figures. The copy at Oxford, given or lent to Sibthorpe in 1786, has 409 figures; the Linnean Society's copy has only 142, but these are annotated by Jacquin; possibly the promised continuation was never sent. No author has been more commented on than Dioscorides, and of the score of commentators none has reached the reputation of P. A. Mattioli, whose works, with or without illustrations, have reached an extraordinary number of editions in various languages. His bibliographer, Moretti, states that he possessed 40 editions, and knew of 11 others in various libraries. Dr. Sibthorp (1758–1796), Professor of Botany at Oxford, may be said to be the last of the line, the splendid 'Flora Græca,' provided for by him, and edited by our founder, Sir J. E. Smith, being finished in 1840 under the care of Dr. Lindley.

At the same meeting Dr. Jackson referred to the new cases for the Linnean Herbarium. He said that in the autumn of 1914 the Council took steps to guard the Linnean Herbarium from damage by enemy aircraft, by storing it in the basement. This arrangement rendered consultation troublesome, and, during the past summer, the Council decided to bring the Herbarium from the basement to its former position in the meeting-room. Additional security was provided by enclosing the packets of plants in a series of 21 metal cases, resting in an iron frame, and enclosed within an outer cabinet lined with sheet asbestos and galvanized steel; similar non-combustible material took the place of the glass which previously shut in the original Linnean cabinets; the three old original cabinets have now been transferred to different uses in another part of the Society's apartments.

At the meeting of the same Society on November 30th Mr. James Small, M.Sc., read a paper "On the Floral Anatomy of some Compositæ." The vascular supply of various bilabiate or ray-florets was discussed, and it was shown that in these the vascular supply varies more or less with the size of the anterior lip of the corolla. The floral anatomy of *Senecio vulgaris* was described in detail. A single bundle leaves the receptacle and divides into one ovarial and ten peripheral strands at the "lower distributive centre." The peripheral strands undergo anastomosis at the "upper distributive centre," where the two stylar and five peripheral bundles are given off. These upper peripheral bundles divide tangentially and the staminal strands pass out into the filaments. The corolla bundles which occupy the line of junction of the petals divide radially at the top of the tube, and the halves anastomose along the edges of the corolla-lobes. The cells lining the stylar canal become lignified and form two pseudo-vascular strands on the lateral walls of the ovary. The corolla in the Cichorieæ has a very constant type of vascular supply, similar to *Senecio*, but with the posterior upper peripheral bundle dividing into three to supply the edges of the ligule and the posterior stamen. *Taraxacum officinale* is described in detail. The ray-florets of *Calendula officinalis* and *Tussilago Farfara* show a very simple type of anatomy. The styles of the disc-florets in *T. Farfara* have four conducting strands. The thickened part of the style in *Arctotis aspera* also shows four strands. In both cases the style is more or less a mechanical pollen-presenter. The peculiar homogeneousness within itself of the Cichorieæ and its isolation from the rest of the Compositæ is extended to the floral anatomy.

Mr. Small then gave a demonstration of "Wind dispersal Apparatus." The purpose of the apparatus is to determine the exact velocity of the wind required to blow the fruits of the Compositæ a sufficient distance to secure proper dispersal. The apparatus consists of an electric fan (the speed of which can be varied), a long, wide glass tube, and an anemometer. The anemometer consists of a beam with a disc attached, upon which the wind impinges, and a scale-pan slung over a pulley, the whole forming a mechanical couple. The pressure is measured by this instrument and converted into miles per hour. The tube is moved away from the fan until the fruits are no longer blown right through; the wind-pressure at this point is taken as the minimum required for the dispersal of the fruit. In this way it has been found that the following minimum winds are necessary for the dispersal of the fruits of the species named below:—

Senecio vulgaris—1·6 m.p.h.=a light air.
Senecio vulgaris var. *radiatus erectus*—1·89 m.p.h=a light breeze.
Ursinia speciosa—2·6 to 2·94 m.p.h.=a light to gentle breeze.
Taraxacum officinale—1·5 m.p.h.=a light air.
Tussilago Farfara—·62 to ·65 m.p.h.=less than a light air.
Centaurea imperialis—7·7 m.p.h.=a moderate breeze.
Leontopodium alpinum—4·78 m.p.h.=a gentle breeze.

To the same meeting, Mr. T. A. Dymes contributed "A Note on the Seed of *Iris Pseudacorus* Linn." There are two forms of seed in each capsule:—flat seeds in the straight portion and more or less rounded seeds at the curved top and bottom of the capsule. The seeds drop or are blown from the placenta after the capsule dehisces. They lie over until the late spring. Those that fall on to the mud and remain there appear to perish from decay. The loose light testa enables the seeds to float for a period of at least four months. Seeds that have not sunk germinate on or near the surface of the water in the latter half of May. The flat seeds germinate before the rounded ones. The cotyledon remains within the endosperm. The radicle elongates and branches freely; it does not curve downwards but grows along the surface of the water. Adventitious roots are formed close up against the seed, and they also branch freely. The unbranched upper portion of the radicle secretes chlorophyll. The plumule grows slowly; it, too, lies along the surface of the water. When the root system is well developed the leaves begin to curve upwards and the seedling gradually assumes a vertical position, after which the leaves grow much more rapidly. The fate of those seeds, if any, that sink before germination has not yet been determined. The dispersal agents are, in the first instance, the wind, and subsequently water. Even on a slow stream the seeds may drift many miles during the four months of the floating period.

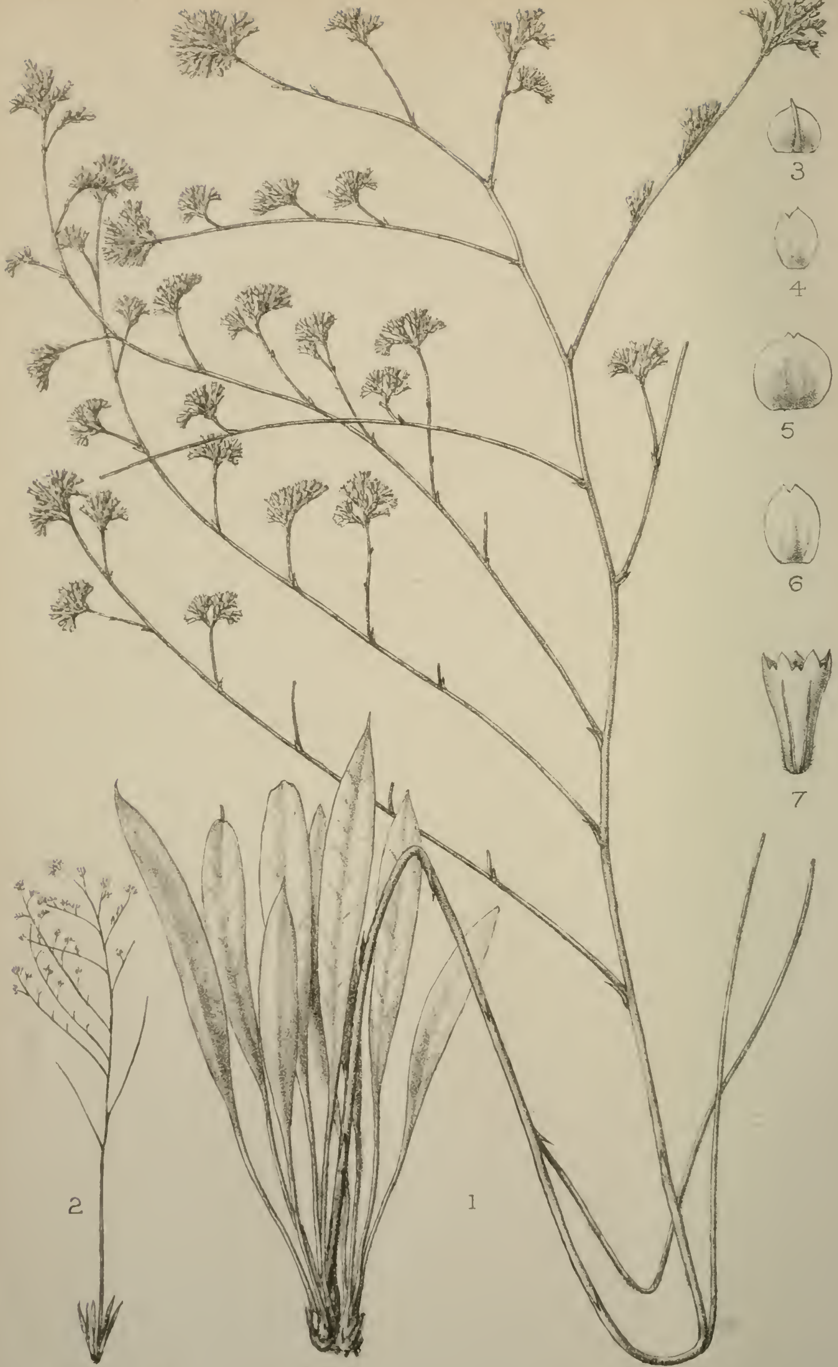
The latest issue (vol. xlii. part 1) of the *Journal of the Royal Horticultural Society* contains an interesting paper by Edith R. Saunders "On an Early Mention of the Double Wallflower"; "Notes on the Flora of North-western Yunnan," by George Forrest; and a "Report of Work in 1914 in Kansu and Tibet," by Reginald Farrer: this and Mr. Forrest's paper are illustrated. Mr. Farrer's paper contains full and interesting notes (without descriptions) on the more important plants discovered by him, which include a new genus—*Farreria* (*F. pretiosa*), named in his honour by Prof. Balfour and Mr. W. W. Smith—and the following new species:—*Aster Farreri*, *A. sikuensis*, *Buddleia Farreri*, *B. Purdomii*, *Callianthemum Farreri*, *Cypripedium Bardolphianum* ("with a lip of brilliant waxy gold, whelked and warted and bubuckled like Bardolph's nose"), *C. Farreri*, *Meconopsis lepida*, *Primula hylophila*, *P. scopulorum*, *P. riparia*, *P. Viola-grandis*, *P. optata*, *P. alsophila*: "*Filix* sp." is an odd entry.

In the *Illinois Biological Monographs*, vol. ii. no. 4 (1916) Mr. F. L. Stevens gives an account of "The Genus *Meliola* in Porto Rico": the monograph is also issued as a separate, price 75 cents. The genus, which is usually regarded as somewhat difficult to deal with, was first put into something like order by Gaillard in 1892, and included about 300 species and varieties: in the present paper are described 62 new species and varieties, and a synopsis is given of all the known Porto Rican forms. The work seems to be very thoroughly done. Mr. Stevens writes:—"It should be remembered that *Meliola* is pre-eminently a tropical genus, almost exclusively so; the occurrence, therefore, of these species in Porto Rico, Africa, and the Philippines, with no present tropical land connection between these countries, implies either that the Meliolas have in the past been of different climatic ranges or that they are the residual flora of previously connected tropical lands." The diagnoses are somewhat short, but appear adequate. It is to be regretted that there are no Latin diagnoses. The International Rules say that descriptions not in Latin are invalid; but it is not to be expected that any systematist will ignore the species in this monograph—or quote them as Saccardo's when they appear in the Sylloge. What would Professor Stevens have done if he had encountered sixty Japanese or Russian diagnoses? There are 86 pages in the separate copies, and five plates: the latter are from "photomicrographs," and do not give sufficient detail.—J. R.

JOHN WILLIAM ELLIS, M.B., died suddenly on August 25, 1916, at Liverpool while serving as Lieut.-Colonel in the Western Command of the R.A.M.C. He was born at Doncaster in 1857; his parents moved to Liverpool the same year, and except for a couple of years he resided in that city. He early became interested in natural history; besides his activities in zoology, archæology, and photography, he was one of the best-known Lancashire botanists. In 1888 he won the Queen's Jubilee Prize (Gold Medal and £50) of the Royal Botanical Society for an essay on "the vegetable substances introduced into the arts and manufactures, and as food, during the fifty years of the Queen's reign." At this time Ellis was secretary of the Liverpool Naturalists' Field Club, of which he was president in 1899 and again in the Jubilee year of the Club. He was also more recently a vice-president of the Liverpool Botanical Society and a member of their South Lancashire Flora Committee. From 1910 he was a member of the British Mycological Society, in whose *Transactions* he published several papers on microfungi: he also published in the *Proceedings of the Liverpool Naturalists' Field Club* for 1912–14 an account of the fungi of the Wirral peninsula.—J. R.

THE *Report for* 1915 *of the Botanical Exchange Club* by the editor and distributor, Mr. A. R. Horwood, was issued in November last. A copy has not reached us for notice, and we are thus spared the necessity of criticism, for which there is abundant material. In the interests of science, however, we must protest against the printing by Mr. Horwood of numerous names for "varieties" of *Crataegus Oxyacantha* without any satisfactory indication of their alleged characters: the conversation between Mr. Druce and the editor as to the validity of these, which extends over four pages and in which practically no one else takes part, should surely have been confined to their private correspondence, as its publication can have no possible scientific value. No fewer than eight pages are occupied by a discussion of the forms of *Capsella Bursa-pastoris*; Mr. Horwood, whose contributions are sometimes signed "Ed." and sometimes with his name, discourses at length upon these "varieties," the diverse opinions as to which arouse a strong suspicion that they are not worth discussion.

The Journal will in future be published by Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C., to whom subscriptions for the present year should be sent. Messrs. Taylor and Francis print the publications of the Linnean Society, the *Annals and Magazine of Natural History*, and other scientific publications, and it is confidently hoped that under their management the Journal will resume the punctuality of appearance and regularity of supply which until last year characterized its production.



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Adlard & West Newman, imp.

Statice asterotricha *C.E.Salmon*

NOTES ON STATICE*.

By C. E. Salmon, F.L.S.

XIII. Statice asterotricha, sp. nov.

(Plate 546)

When working upon *Statice Gmelini* in 1909, I was much interested in a particular example collected in Bulgaria (lent from the Herbarium of the Edinburgh Botanic Garden), so named, which appeared to me decidedly not that species; as however the specimen was a poor one and as the herbaria at Kew, British Museum, and elsewhere could furnish no other material, there the matter had to rest.

Since then, fortunately, Professor I. B. Balfour has been able to send me a much more complete and satisfactory sheet of specimens, and, believing the plant to be undescribed, I have drawn up the following account of it.

Statice asterotricha, sp. nov.

Planta elata, plus minusve *scabrido-tuberculata pilisque stellatis copiose* adspersa; folia *pariter vestita, oblanceolata*, apice acuta, *longe petiolata*, tuberculis albidis carentia. Scapus ad medium vel *infra medium* ramosus; rami inferiores steriles nulli vel subnulli. Spicæ breves et *densifloræ*; *bracteæ glabræ*, exterior margine membranaceo latissimo cincta, interior quam exterior *vix* $1\frac{1}{2}$*-plo longior*; calyx infundibuliformis *fere glaber* plerumque ad basin *parce hirsutus*; calycis lobi brevissimi triangulari-acutiusculi, dentibus intermediis interpositis.

Plant tall, 40–65 cm. high, ± copiously scabrid-tuberculous and stellately-hairy (with rare simple hairs). *Leaves* small compared with height of scape, ± copiously scabrid-tuberculous and stellately-hairy (simple hairs rare), lamina oblanceolate about 7–11 cm. long and about 13 mm. broad, pinnately veined, not showing white (salt) tubercles when dry, tapering gradually into a long petiole almost length of blade, apex acute with or without a mucro. *Scape* ± copiously tuberculous-hairy with stellate hairs (simple rare), less so nearer apex, erect, branched at or below the middle, sterile branches absent or very few. *Branches and branchlets* ascending-patent, usually recurved. *Scales* triangular-acuminate, densely hairy (less so near apex of scape). *Spikes* patent, short and dense-flowered, the lateral sometimes sessile upon the branches. *Spikelets* 1–2-flowered, with often an additional rudimentary one. *Outer bract* about $1\frac{3}{4}$ mm. long, orbicular- or triangular-ovate, apex ± acute, keeled with the keel projecting as an apiculus, herbaceous for little more than half its height with very broad membranous margin, glabrous. *Middle bract* $1\frac{3}{4}$–2 mm. long, irregularly ovate-oblong, apex truncate or bifid, hyaline with veins, glabrous. *Inner bract* $2\frac{1}{4}$–$2\frac{3}{4}$ mm. long, orbicular-ovate, with broad membranous margin which is often, together with herbaceous portion (which extends about two-thirds its height), emarginate or jagged at apex, glabrous, scarcely 1½ times longer than outer bract. *Bracteole* 1, 2½–2¾ mm. long, irregularly ovate, apex rounded, pointed or jagged, hyaline with veins, glabrous. *Calyx* about 4 mm. long, infundibuliform, membranous but only slightly dilated above the middle (including lobes), almost glabrous, usually sparingly hairy with ± appressed hairs near base (on veins and between them), never extending half-way up calyx; calyx-lobes very short (½ mm.), triangular, and ± acute, short sub-lobes present; veins of calyx strong, not reaching base of calyx-lobes. *Capsule* slightly exceeding calyx-lobes, finely rugose.

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* See Journ. Bot. 1903, 65; 1904, 361; 1905, 5, 54; 1907, 24, 428; 1908, 1; 1909, 285; 1911, 73; 1913, 92; 1915, 237, 325.

Distribution. Bulgaria. "In graminosis ad Manolovo." 1893 and 1900. Leg. V. Stribrny, Hb. Edinburgh (as *S. Gmelini* Willd.).

According to Boissier's arrangement of *Statice* (DC. Prodr. xii. 643, 1848), this new species would fall in his Section IV. *Limonium*, subsection 1. *Genuinæ*, which he defines as follows:—"Folia sæpius ampla. Scapi elati. Rami steriles pauci vel nulli. Panicula ampla; spicæ laxæ vel densæ, fere nunquam regulariter imbricatæ. Calycis limbus propter denticulos minutos inter lobos majores sitos sub-10-lobus," and would occupy a position between *S. tomentella* Boiss. and *S. Gmelini* Willd. From *S. tomentella* (Journ. Bot. 1911, tab. 511), of which it has the dense spikes, and its variety *sareptana* (*S. sareptana* Becker) the Bulgarian plant now described may be readily separated by its stellate pubescence and narrow long-petioled leaves; the same characters distinguish it from *S. Gmelini* (the name given it by the collector), which is a glabrous plant with broad short-petioled leaves. There are, besides, the more minute differentiating features of calyx, bracts, etc.

The presence of numerous stellate hairs on leaves, scape, etc. in *S. asterotricha* would seem to indicate some affinity with *S. latifolia* Smith, which also possesses them; but that species differs widely in having remarkably large and broad leaves, smaller flowers in lax spikes, calyx wanting sub-lobes, and bracts almost wholly hyaline. These points caused Boissier (*op. cit.* 659) to include *S. latifolia* amongst the plants forming his subsection 5. *Hyalolepideæ*—"Rami inferiores steriles rarius pauci, sæpius numerosi, multifidi. Spiculæ minutæ numerosissimæ laxe vel densiuscule spicatæ, sæpius paniculam multifloram formantes. Folia plana vel ad squamulas reducta. Bracteæ saltem inferiores fere a basi albo-hyalinæ."

Bulgaria, like others of the Balkan States, is apparently not prolific in Sea Lavenders; besides the one now described, *S. Gmelini* and *S. latifolia* are the only others reported.

Explanation of Plate 546.

1. *Statice asterotricha*, ½ nat. size.
2. Reduced sketch of plant, $\frac{1}{12}$ nat. size.
3. Outer bract; 4, middle bract; 5, inner bract; 6, bracteole; 7, calyx—all enlarged four times.

NOTES ON JAMAICA PLANTS.

By William Fawcett, B.Sc., & A. B. Rendle, F.R.S.

In continuing our work on the Flora of Jamaica, we have found it necessary to describe a few additional species, diagnoses of which are given below. We have added some notes on nomenclature, which may be of general interest. Previous notes will be found in Vol. xlvii. 3, 122, 263 (1909); Vol. xlviii. 106 (1910); Vol. l. 177 (1912); Vol. li. 123 (1913); Vol. lii. 74, 142 (1914).

Leguminosæ.

Tephrosia Wallichii Graham in Wall. Cat. n. 5640 (nomen). Herba basi sublignosa, ramulis glabris aut pubescentibus demum teretibus. Foliola 11–19 cuneato-oblonga, viridia, supra glabrescentia, subtus glauca, pilis albis brevissimis subsericea, 1·5–2·5 cm. l., ·5–1·5 cm. br. Stipulæ lineari-lanceolatæ, 5–7 mm. l. Racemi oppositifolii, ad 1 dm. l., floribus vel florum 2–3 fasciculis remotis. Flores coccinei aut albi. Calyx 4·5–5 mm. l., dentibus setaceis tubo fere duplo longioribus. Vexillum elliptico-rotundatum, extus sericeum, 6 mm. l., 8 mm. lat., unguicula cuneata, 2 mm. l. Alæ oblongæ, circa 5 mm. l., unguicula 1·5 mm. l. Carina alas subæquans. Stylus glaber, stigmate breviter penicillato. Legumen 3–3·5 cm. l., puberulum vel glabrum, 5–6-spermum.

Type in Herb. Wallich in Herb. Kew.

Broughton! Palisadoes, *Harris* 6753!—Dominica, Trinidad, Guiana, India.

We agree with Mr. J. R. Drummond's note in Herb. Mus. Brit. that this species is distinct from *T. purpurea* Pers., but can find no published description.

Dolichos urens L. Systema (ed. 10, 1162) is based on Patrick Browne's description of *Zoophthalmum* (Hist. Jam. 295) and on Plukenet's figure in *Phytographia*, t. 213. f. 2. There is no specimen in the Linnean Herbarium. Plukenet's specimen in Sloane's Herbarium (vol. xcvii. f. 86) has leaves which are glabrous on both sides. Browne's description states that the corolla has a very large standard, and that the peduncle is "seldom under four or five feet in length."

Jacquin (Enum. Pl. Carib. 27, 1760) diagnoses a species *D. altissimus* which he distinguishes from *D. urens* merely as having "leguminibus æqualibus," and cites for it Rheede's *Hortus malabaricus*, viii. t. 36. Rheede's plant is an Old World species characterized, as the plate also indicates, by smooth pods; it was subsequently named *D. giganteus* by Willdenow (Sp. Pl. ed. 4, 1041), who separated it from *D. altissimus*, which, as Jacquin was dealing only with American species, must have referred primarily to a New World plant. In order to understand clearly what Jacquin had before him, we must refer to the Select. Stirp. Amer. Hist., where he gives full descriptions (with figures) of each species, and also to the Ed. pict., where there are excellent coloured figures. *D. urens* Jacq. (Sel. Stirp. Amer. 202, t. 84) is a plant with leaves tomentose beneath, short peduncle, yellow flowers, a spreading erect standard conspicuously shorter than the wings and keel, and a pod marked on the outside with numerous transverse lamellæ; it is a native of the Caribbean Is. *D. altissimus*, on the other hand. has leaves glabrous on both sides, a long peduncle more than 12 feet in length, blue-purple flowers, a standard adpressed to the wings and keel and nearly as long as these; it is a native of Martinique. It is also of interest to note that Jacquin indicates as doubtful the synonym from Rheede already quoted. Hence it is evident that *D. altissimus* Jacq. as indicated by the Sel. Stirp. Amer. and Ed. pict. is the same as the plant of Browne and Plukenet, on which Linnæus based his *D. urens*. Jacquin's *D. urens* represents a second species.

In *Species Plantarum* (ed. 2, 1020), Linnæus, under *D. urens*, adds to the citations previously given in the *Systema* from Browne & Plukenet, others as follow:—

1. " Jacquin Amer. 27," *i. e.* Enum. Pl. Carib. 27.

2. " Phaseolus brasilianus &c. Sloane Jam. 68., Hist. i. 178," which latter, as the specimen in Herb. Sloane (iii. 69) shows, is a distinct species from the plant of Browne & Plukenet, and has pods marked with numerous transverse lamellæ, leaves tomentose beneath, and spreading erect standard: it is, in fact, *D. urens* Jacq. (Sel. Stirp. Amer.) non L. Syst.

3. " Phaseolus hirsutus &c. Plum. Sp. 8, ic. 222," which is the plant recently named by Urban (Symb. Ant. iv. 311) *Pachyrrhizus erosus*.

4. " Mucuna. Marcgr. Bras. 19," which is the same as Sloane's specimens.

5. " Kaku valli. Rheed. Mal. 10 [recte 8] p. 63," which is *D. gigantea* Willd.

Willdenow (Sp. Pl. ed. 4, 1042 (1800)), under *D. urens*, repeats the above synonymy and adds Jacq. Amer. 202, t. 182. f. 84; he also, following Jacquin, adds to the description, " folia subtus tomentosa nitida." As already noted, he recognizes as distinct *D. altissimus* Jacq. from Martinique (flores violacei).

De Candolle (Prodr. ii. 405), in revising Adanson's genus *Mucuna*, follows Willdenow, retaining *M. altissima* for Jacquin's Martinique plant (which he had not seen) with glabrous leaves and purple flowers, and *M. urens* for the Caribbean plant with leaves tomentose beneath and yellow flowers.

From the above it will be seen that *Dolichos urens* Jacq. and *Mucuna urens* DC. do not represent the original *D. urens* L. Syst., but a second well-characterized species which we propose to call Mucuna Sloanei. The other species, *D. urens* L., must be cited as Mucuna urens, nobis (non DC.).

The confusion of names originated with Jacquin, who did not appreciate on what Linnæus's *D. urens* was based and who also regarded his own *D. altissimus* as identical with an Old World species. The confusion was continued by Linnæus in Sp. Pl. ed. 2, and has been carried on by subsequent authors.

Clitoria Zoophthalmum (Syst. ed. 10, 1172) is presumably, from the species-name and diagnosis, a synonym of *D. urens* L. Linnæus quotes no reference, there is no specimen in the Linnean Herbarium, and the name does not appear in the second edition of Sp. Pl.

DOLICHOS FILIFORMIS L. (Syst. ed. 10, 1163) was founded on Patrick Browne's plant described (Nat. Hist. Jamaica, 294) as "Dolichos herbaceus minor, foliis linearibus, siliqua polyspermi compressa."

There is a specimen in Linnæus's Herbarium named by himself, but we know of no other specimen from Jamaica, although Browne speaks of it as being "frequent about Old Harbour." Part of the original specimen in the Linnean Herbarium was given by Smith to Banks, and is in Herb. Mus. Brit. This specimen we find to be *Galactia parvifolia* A. Rich. (var. *triphylla* Urb. Symb. Ant. ii. 314)

Mr. H. N. Ridley kindly offered to look for this plant at Old Harbour on his recent visit to Jamaica, and has succeeded in finding specimens which differ from the above in having monophyllous leaves with larger leaflets and correspond with Urban's var. *monophylla* (*Galactia angustifolia* var. *monophylla* Griseb.).

Macfadyen (Jam. i. 286) cites *Dolichos filiformis* L., but his description shows that he is dealing with a very different plant, namely *Dioclea reflexa* Hook. f.

Galactia filiformis Benth. is also a different species founded on *Galega filiformis* Jacq., a native of Hispaniola.

PTEROCARPUS DRACO L. Linnæus, in publishing this name (Sp. Pl. ed. 2, 1662), gave no diagnosis, but referred to his *Materia Medica*, 522, and to Jacquin's Hist. (Sel. Stirp. Amer. 283, t. 183. f. 92). *Pterocarpus* of Mat. Med. is based on Hermann's *Flora Zeylanica*, n. 417; of this there are two specimens in Hermann's Herbarium, both, as Trimen pointed out, being the Old World species named by Bentham *Derris uliginosa*. Jacquin named his species, which came from the New World, *Pterocarpus officinalis*; this name has priority over Linnæus's, and must therefore be retained for the American plant which has been cited as *P. Draco*.

Cassia Broughtonii, sp. nov. "Frutex 3-pedalis" (Harris); ramuli pilis curvatis dense pubescentes. Folia 7–11 cm. l.; foliola 19–22(26)-juga, lineari-oblonga, basi obliqua rotundata, apice mucrone setaceo instructa, costa parum excentrica, latere latiori penninervio, nervis paucis distantibus, nervis 3–4 basalibus subadditis, subtus vel utrinque prominulis, margine ciliolulata, supra glabra, infra glabrescentia, 14–18 mm. long., 2–2·5 mm. lat. Petioli (5–8 mm. l.) rhachidesque pubescentes; glandula longius pedicellata, campanulata, infra jugum infimum posita. Stipulæ lanceolatæ, acuminatæ, striatæ, ciliatæ, 13–14 mm. long. Flores parvi, sæpius 2–3-ni, pedicellis axillaribus atque supra-axillaribus, 5–7 mm. longis. Bracteæ striatæ, 5 mm. long., bracteolæ striatæ, 3 mm. long. Sepala pubescentia, 7–8 mm. long. Petala flava, 6–8 mm. long. Stamina 9. Legumen oblongo-lineare, valde marginatum, villosum, 4·5–5 (2·5) cm. long., 4·5 mm. lat., seminibus 16. Types in Herb. Mus. Brit., Herb. Kew., Herb. Jam., and in Broughton's collection in the Bristol Museum.

Hab. Jamaica, "in fossis et udis," *Broughton*! *Macfadyen*! King's House Grounds, 600 ft., *Harris*! 6949.

This species is near *C. glandulosa* L., but differs in the leaves not being multiglandular, in the corolla not being longer than the calyx, and in the pod being villose. It is named in honour of Dr. Arthur Broughton, in whose collection occurs the earliest specimen known.

This, which is in excellent condition, was collected between the years 1786 and 1790. For a note on this interesting early Jamaican collection see Journ. Bot. liii. 104 (1915).

POMPHIDEA *Miers*.

This genus was described by Miers in his account of the S. American Apocynaceæ (p. 18, t. i. d., 1878) from a specimen in the British Museum Herbarium collected by Swartz in Jamaica. Miers's description and drawings of the pistil which led him to place the genus in the family Apocynaceæ near *Ambellania*, are inaccurate; and examination of Swartz's material shows the floral structure to be that of *Ravenia*, a genus of Rutaceæ. Urban (Symb. Antill. vi. 96), as a result of an anatomical examination of a fragment of a leaf and twig of the original specimen, had previously transferred *Pomphidea* to this family.

Pomphidea Swartziana Miers therefore becomes RAVENIA SWARTZIANA, comb. nov.

Erythroxylum jamaicense, sp. nov.

Arbor 4·5 m. alt. Folia elliptica apice atque basi rotundata, 4–7 cm. longa, 2·5–4 cm. lata, petiolo circa 1 cm. l. Stipulæ 2–3 mm. long., persistentes triangulari-ovatæ, non carinatæ, apice erecto, breviter setuloso. Flores in axillis foliorum 1–2. Pedicelli 3–4 mm. l., ad apicem valde incrassati. Calyx ad $\frac{1}{3}$ fissus; laciniæ ca. 1 mm. longæ. Petala fere 3 mm. longa; lamina oblonga, 1·6 mm. longa; unguicula 1·3 mm. longa; ligula ca. 2 mm. longa, paulum supra medium plicata et reflexa, sinu gibboso, apice bilobulata. Urceolus stamineus calyce paulo brevior. Stigmata capitata. Drupa 1·3 cm. longa, 2–2·5 mm. lata, lineari-oblonga, curvata.

Hab. Peckham Woods, Clarendon, 2500 ft. alt. *Harris*, 11,203! In Herb. Bot. Dep. Jamaica.

This species resembles *E. incrassatum* O. E. Schulz in the thickened pedicel.

SOME NEW SPECIES OF SEDUM.

By R. LLOYD PRAEGER.

IN the course of a revision of the genus *Sedum* as found in cultivation, undertaken for the Royal Horticultural Society, a few new species have been unearthed from among the chaos of wrongly-named plants which characterize the Stonecrops in our gardens. Although the genus as a whole is a difficult one, the majority of the species are tolerably easily diagnosed; but there remain one or two intricate groups and also some polymorphic species, and the plants found in cultivation include many of these. The result is a hopeless confusion in gardens and a wealth of erroneous names—largely *nomina nuda*—for forms of *S. album*, *S. reflexum*, *S. rupestre*, *S. anopetalum*, *S. Aizoon*, *S. spurium*, *S. roseum*, and to a less extent among some other species. The confusion has been no doubt assisted by the fact that these plants dry so badly that reference to herbaria is often futile unless careful and minute diagnosis is resorted to.

One of the species described below is very widely spread in gardens, under the name of one or other of its allies, from Japan on the east to Canada on the west. The remainder are more or less recent introductions into cultivation, for the opportunity of growing and studying which I am indebted to the Directors of the Botanic Gardens at Edinburgh, New York, and Sapporo, to Dr. J. N. Rose, of the Smithsonian Institution, to Mr. H. J. Elwes, F.R.S., and to Mr. E. A. Bowles, M.A. The descriptions have been drawn up from living material, and most of the plants have been studied during several successive seasons—a necessary precaution in a group where so much variability exists, and where immature plants are so misleading. The plants will be figured later in the *Journal of the Royal Horticultural Society*.

I should like to record my indebtedness to Mr. W. W. Smith for assistance in the preparation of this paper.

Sedum (§ Rhodiola) **longicaule**, sp. nov.

Species *S. Kirilowi* Regel fortasse proxima, pro sectione Rhodiola altissima; caule 60–90 cm. alto, foliis 6–7·5 cm. longis angustis attenuatis reflexis integerrimis satis distincta.

Planta perennis dioica, caules steriles non edens, glabra. Rhizoma multum incrassatum, caulium vetustorum reliquiis haud obtectum. Caules annui, erecti, pauci, simplices, teretes, 60–90 cm. alti, 6 mm. diametro, omnino foliosi, glabri, rubescentes. Folia alterna, sessilia, a basi recurvo-pendentia, mediana 6–7·5 cm. longa, ad basin 6 mm. lata, lineari-attenuata, apice acuta, basi rotundata vel amplexicaulia, margine integerrima, supra atroviridia, subtus pallida et glaucescentia, nervo supra albido, infra valde prominente percursa; folia suprema pauca, medianis minora; folia infima minutissima. Inflorescentia densa, circa 2·5 cm. longa, 4–5 cm. lata, planiuscula, parce bracteata. Flores ♀ tantum visi 5(crebro 6, nonnunquam 4 vel 7)-meri. Calyx poculiformis, carnosus, viridis, 2·2 mm. longus, segmentis brevibus distantibus subulatis, partem concretam æquantibus, apice ipso obtusiusculis. Petala lineari-subulata, erecta, carnosa, obtusa, subteretia, sepalis vix sesquilongiora, viridia. Squamæ . . . . Carpella viridia, 5 mm. longa, 2 mm. lata, stylis brevibus recurvatis coronata.

I found this remarkable plant in the garden of Mr. H. J. Elwes, who unfortunately cannot now remember whence it was obtained. It is certainly Asiatic, probably Tibetan, Mongolian, or Chinese, and very likely came from seed brought home by one of the recent botanical explorers of that part of Asia. A very distinct species, and much the tallest of the Rhodiolas. The male plant is as yet unknown. By an oversight I neglected to note the characters of the hypogynous scales. This omission will be rectified in due course in the *Journal of the Royal Horticultural Society*.

Sedum (§ Rhodiola) **purpureoviride**, sp. nov.

Species chinensis ab affinibus caule glanduloso-pubescente, foliis oblongo-lanceolatis obsolete dentatis acutiusculis subtus glanduloso-pubescentibus, inflorescentia densiuscula multiflora foliosa, florum ♂ et ☿ sepalis, petalis, carpellisque viridibus, squamis filamentisque purpureis distinguenda.

Planta perennis multicaulis, caules steriles non edens, dioica vel

hermaphrodita. Rhizoma crassum, erectum, caulium vetustorum reliquiis haud cinctum. Caules erecti, 15–30 cm. alti, basi 3 mm. lati, teretes, dense glanduloso-pubescentes. Folia alterna, numerosa, sessilia, 2·5–3 cm. longa, 3–4 mm. lata, anguste oblongo-lanceolata, apice acutiuscula, basi rotundata, plana, margine obsolete dentata et sæpe reflexa, subtus glanduloso-pubescentia nervo valde prominente perglanduloso notata. Flores ♂ plerumque 5-meri, 3 mm. longi, 9 mm. lati. longe pedicellati, in cymas terminales umbellatas multifloras densiusculas foliosas 2 cm. longas, 4 cm. latas dispositi. Sepala oblongo-lanceolata, obtusa, carnosa, viridia, 2·5 mm. longa. Petala lineari-lanceolata, patentia, 4 mm. longa, apice obtusa perconcava, viridia, basi purpurea. Stamina 3·6 mm. longa, filamentis purpureis, antheris pallide aureo-rubris. Squamæ amplæ, duplo longiores quam latiores, convexo-arcuatæ, emarginatæ, purpureæ. Carpella erecta, atroviridia, 2·5 mm. longa. Flores ⚥ :—sepala, petala, stamina, squamæ eis fl. masculinæ similia; carpella erecta, viridia, staminibus paulo breviora; styli erecti, filiformes, 1·5 mm. longi.

Described (excepting the hermaphrodite flower) from specimens flowered in 1916 from roots received from Edinburgh with the label "*Sedum* sp. Yunnan, Forrest." No further information regarding these roots is available. Prof. I. Bayley Balfour has kindly submitted four sheets, representing three gatherings, from the Edinburgh Herbarium, which prove to be the same species. The labels read:—"N.W. Yunnan, Père Mombeig, no. 115." "Tsekou, Mombeig" (no number or date). "On rocks, &c., shrub and forest, 13–14,000 ft., Doker-la, July 1913, F. K. Ward, no. 744." These specimens, ten in number, are all, like the living plant, male, with the exception of one of the Tsekou plants, which is hermaphrodite. In the Kew Herbarium there is also a male specimen, bearing the label "South-west China. *Sedum* ——. coll. Père Mombeig. Received 1908."

Sedum (§ Telephium) **pseudospectabile**, sp. nov.

Species *S. spectabili* Boreau valde affinis sed caule altiore, internodiis longioribus, foliis viridibus (nec glaucis) minoribus internodia æquantibus (nec sesquilongioribus), inflorescentia floribusque minoribus facile distinguenda.

Planta perennis glabra, surculos steriles non edens. Caules annui erecti haud numerosi 30–60 cm. alti, lati 5 mm. basi, simplices. Folia ternata (nonnunquam opposita aut 4-verticillata), 3·5–5 cm. longa, circ. 3 cm. lata, internodia æquantia aut breviora, sessilia, amplexicaulia, inferiora obovata, superiora ovata, margine integerrima vel obscure dentata, carnosa, viridia. Inflorescentia terminalis, compacta, plana, circa 5 cm. longa, 5 cm. lata. Flores rosei, 8 mm. longi, 6 mm. lati. Sepala glaucescenti-viridia, apice rubra, ovato-lanceolata, acuta, 2·5 mm. longa, segmentis parte concreta triplo longioribus. Petala 4·5 mm. longa, ovato-lanceolata, acuta, erecto-patentia, rosea. Stamina petalis sesquilongiora. Squamæ flavescentes, quadratæ, incurvatæ, paulo cuneatæ, sesquilongiores quam latiores. Carpella erecta gracilia viridia petalis subæquilonga, stylis paulum recurvatis coronata.

Grown at Edinburgh from seeds collected by Prof. I. Bayley Balfour in 1910 at Chinwangtao, on the sea-coast due east of

Pekin. Received also from the University Botanic Garden, Sapporo, Japan, under the name of *S. spectabile.* I have had the plant in cultivation for two years; it appears distinct from *S. spectabile,* to which it is closely related.

Sedum (§ TELEPHIUM) **cauticolum**, sp. nov.

Species japonica *S. Sieboldii* Sweet valde affinis, sed foliis oppositis nec ternatis, purpureo-punctatis nec rubro-suffusis, petiolatis nec sessilibus, inflorescentia laxa perfoliosa nec densiuscula nec parce foliosa, pedicellis longioribus, stylis carpella subæquantibus nec multum brevioribus, carpellis basi cuneatis nec abrupte contractis, sessilibus nec distincte pedicellatis, squamis rectis nec sursum valde curvatis, albidis nec aureis, retusis nec subintegris, facile distinguenda.

Planta perennis glauca, caules steriles epigæos non edens. Caudex brevissimus incrassatus, caules floriferos a basi adscendentes et cauliculos hypogæos gracillimos et radices carnosas emittens. Caules annui circa 15 cm. longi, procumbentes vel diffusi, teretes, glabri, atropurpurei. Folia opposita raro alterna, petiolata, 2·5–3 cm. longa; lamina orbiculari-spathulata, obtusissima, obtuse pauci-dentata, glauca, subtus et nonnunquam supra purpureo-punctata, circa 2–2·25 cm. longa, 1·50–1·75 cm. lata; petiolus circa 5 mm. longus. Inflorescentia laxa, valde foliosa, planiuscula, umbellato-cymosa, pedicellis gracillimis flores superantibus. Calyx in segmenta lineari-lanceolata acuta glauca 2·5 mm. longa ad imum fissus. Petala ovato-lanceolata, acuta, patentia, 1 cm. longa, roseo-purpurea. Stamina petalis æquilonga, filamentis roseis, antheris purpureis. Squamæ patentes, rectæ, oblongæ, retusæ, albidæ. Carpella erecta basi cuneata, stylos erectos subæquantia, pulchre rosea, albo-maculata.

Received from Prof. Miyabe, of Sapporo University, as "*Sedum* sp. aff. *S. Sieboldii,* with opposite leaves and early-flowering habit. Cliffs, southern coast of Yezo." A handsome plant, interesting as being nearly related to the well-known *S. Sieboldii*, one of the most distinctive of the *Telephium* section of the genus. It commences to bloom in September, three weeks before its ally.

Sedum (ser. AIZOONTA) **Ellacombianum**, sp. nov.

Species japonica *S. Aizoonti* L. et *S. kamtschatico* Fisch. & Meyer valde affinis. Cum priore concordat caule simplice, inflorescentia densa, flore fructuque persimilibus; sed caudice haud multum incrassato, radicibus non tuberosis, caulibus permultis brevibus diffusis (nec altis nec erectis), foliis spathulatis (nec lanceolatis), crenato-serratis (nec acute serratis), bene differt. Ad *S. kamtschaticum* appropinquat habitu atque caudice supra ramosissimo (qua de causa *S. Aizoonti* valde dissimilis), sed caulibus simplicibus, foliis latioribus crenatis, inflorescentia densa, floribus minoribus differt.

Planta perennis glabra, caules steriles non edens, arcte cæspitosa. Caudex supra ramosissimus, ramulis ultimis gracilibus. Caules annui, numerosi, simplices, diffusi, 10–15 cm. longi, 2 mm. diametro. Folia opposita, circa 3·5 cm. longa, 1·75 cm. lata, breve petiolata, obovata vel spathulata, basi cuneata, supra medium crenato-serrata, pulchre viridia. Inflorescentia planiuscula, compacta, umbellato-cymosa, 3–5 cm. lata. Flores 1·5 cm. diametro ex toto aurei. Sepala,

petala, stamina, squamæ ut in *S. Aizoonte.* Carpella quoad marginem interiorem convexiora quam ea *S. Aizoontis*, et in rostrum abruptius contracta.

Very widespread in cultivation, being found in gardens all over Europe, westward to Canada and eastward to Japan: most frequently under the name *kamtschaticum*, but sometimes as *Aizoon*, *Selskyanum*, *hybridum*, etc., to all of which it is allied, but from which it can be distinguished at a glance. In herbaria it appears to be very rare. The only example in the British Museum Herbarium helps to define its native distribution. It is a small specimen from Hance's Herbarium, collected as *S. kamtschaticum* at Hakodate, Japan, by Maximowicz in 1861; so that the plant belongs to N.E. Asia, as would be expected from its affinities. The only dried specimen at Kew is from the gardens, labelled "*Sedum* ——, Kew Gardens, Sept. 18, 1901. Legit N. E. Brown," showing that that botanist, who paid much attention to the Kew Sedums, had noticed its peculiar characters.

Plants received from a dozen different countries have been grown in my own garden, and show that the plant is very constant in its characters, though belonging to a group several species of which display considerable variation; but this constancy may be due to all or most of the plants found in cultivation having had a common origin. Its very wide distribution in gardens points to early introduction.

Named in memory of Canon H. N. Ellacombe, keenest of gardeners and kindest of friends, at whose suggestion I undertook a revision of the cultivated Sedums.

Sedum (§ SEDA GENUINA) **pyramidale**, sp. nov.

Species insignis ab omnibus adhuc in cultura cognitis distinctissima. Texto carnoso fragili, foliis laxe rosulatis, linearibus, pollicaribus, subteretibus, obtusis, spina terminatis, glaucis, inflorescentia dense pyramidali semipedali, floribus permultis, carpellis stipitatis dignoscenda.

Planta perennis (in cultu sæpe biennis) valde carnosa, fragilis, glauca; juvenalis laxe rosulata. Folia sessilia linearia, 2·5 cm. longa, 4·5 mm. lata, 3 mm. crassa, integra, supra leviter, subtus multum convexa, apice spina gracili 1·5 mm. longa ornata, glauca. Inflorescentia densa, foliosa, pyramidalis, circa 15 cm. alta, a basi (ibique 7 cm. lata) ad apicem plantæ florifera. Flores permulti, 1·2 cm. diametro, 7–8 mm. longi, stelliformes. Calyx poculiformis, viridis, purpureo-punctatus, segmentis ovatis apiculatis valde carnosis. Petala 6–7 mm. longa, calyce triplo longiora, lanceolata, acuta, intus alba, extus ad apicem viridi-rubro-maculata. Stamina petalis paulo breviora, antheris purpureis. Squamæ duplo longiores quam latiores, erecto-patentes, pedicellis carpellorum breviores, retusæ, pallide luteæ. Carpella erecta, petalis subæquilonga, alba, in stylos graciles divergentes attenuata, infra in stipites graciles 2 mm. longos abrupte contracta.

A remarkable species collected in 1915 by Mr. Reginald Farrer on roofs and rocks (especially the former) at and about Siku, Kansu, 6400–8000 feet (Farrer, no. 336). Apparently not of easy culture;

but a fine flowering specimen was sent to me last September by Mr. E. A. Bowles, from which the preceding description is drawn up. Normally I think in autumn, but in cultivation irregularly, the linear leaves give way to a dense subglobular spiny bud recalling the winter condition of *Cotyledon spinosa* L.; after the resting-stage this develops first into flat fleshy cuneate-spathulate spine-tipped leaves, the edges of which in the upper portion of the leaf are quite thin; later into normal linear subterete leaves, as in the description. Mr. Farrer writes that in nature the plant is perennial, with plenty of barren rosettes and a growth-form resembling that of *Saxifraga Cotyledon*; in cultivation it tends to be monocarpic.

The plant appears to be related to *S. Chaneti* Léveillé in Fedde, *Repertorium*, v. 99 (1908) (from Pe-Tchi-Li), but that species is so inadequately described that all that can be said with certainty is that the two species are distinct.

Sedum griseum, sp. nov.

Species mexicana suffruticosa ad *S. Bourgæi* Hemsley et *S. guadalajaranum* S. Watson spectans; ab priore statura minore, habitu compactiore, ramis griseis (nec rubris), foliis glaucescentibus (nec viridibus), lineari-fusiformibus (nec linearibus), subteretibus (nec supra planis), cyma compacta (nec laxa), floribus viridescenti-albis (nec roseo-albis), squamis brevibus flavescentibus (nec purpureis) distinguitur; *S. guadalajaranum* valde gracilior est, atque foliis tenuioribus, inflorescentia laxa, maximeque caudice incrassato radicibus tuberosis obsito facile separandum.

Suffrutex erectus multiramosus glaucescens 14–18 cm. altus, ramis diffusis rubro-griseis in parte superiore foliosis. Radices fibratæ. Folia alterna, coarctata, patentia vel reflexa, sessilia, lineari-fusiformia, obtusa, subteretia, glauca, 1·25 cm. longa, 2 mm. lata, 1·5 mm. crassa. Flores 1·25 cm. diametro pedicellis longiores. Inflorescentia parva, densa, foliosa, convexa, 2–3 cm. lata. Sepala paulo inæqualia, oblongo-attenuata, obtusiuscula, valde carnosa, viridia, 3–4 mm. longa, in calcar vix producta. Petala patentia vel reflexa, lanceolata, acuta, carina viridescenti subtus prædita, 6–7 mm. longa. Stamina petalis æquilonga, filamentis albis, antheris rubris. Squamæ minutæ, quadratæ, flavescentes. Carpella erecta demum recurvata, viridia, staminibus breviora, stylis longis gracilibus coronata, in fructu 6 mm. longa.

Received from New York Botanic Garden labelled "*S. Bourgæi*, No. 2," but it is quite distinct from that species, though clearly allied to it. Habitat not certainly known, but it undoubtedly comes from Mexico. Received also from Haage & Schmidt of Erfurt as *S. farinosum*. With *S. farinosum* Lowe, a Madeiran species, the present plant has no affinity; but the misnomer probably arose owing to confusion with *S. farinosum* Rose = *S. bellum* Rose, a Mexican plant of appearance quite different from the species under consideration.

Sedum amecamecanum, sp. nov.

Species mexicana habitu suffruticoso, foliis oblanceolatis subacutis viridibus, inflorescentia suborbiculari, floribus pallide luteis, squamis supra pulchre aureis, facile dignoscenda:

Planta suffrutescens, glabra, 20–30 cm. alta, erecta, ramis diffusis, Caulis subtus nudus, ramis foliosis rubris. Folia alterna, subconferta, patentia vel reflexa, sessilia, oblanceolata, subacuta, in calcar brevissimum obtusum producta, 1·75 cm. longa, 6 mm. lata, plana, carnosa, viridia. Inflorescentia sessilis, densa, suborbicularis, circa 2·5 cm. diametro, foliosa; bracteæ superiores sepalis similes. Flores 1·5 cm. diametro, pallide lutei. Calyx in segmenta inæqualia, linearia vel clavata, obtusa, breviter calcarata, ad imum fissus, valde carnosus, viridis. Petala late lanceolata, acuta, pallide lutea, 8 mm. longa, sepalo longissimo circiter triente longiora. Stamina lutea, petalis triente breviora. Squamæ breves, quadratæ, emarginatæ, in parte inferiore albidæ, supra aureæ. Carpella erecta, staminibus æquilonga, viridescenti-lutea, in stylos aureos abeuntia.

Sent by Dr. J. N. Rose from Washington to the Royal Horticultural Society under the designation "*Sedum*, no. 06.10." Dr. Rose informs me that it was collected at Amecameca, Mexico, by C. A. Purpus, in January 1906, no. 108. It is quite distinct from any of the other species of the difficult sub-shrubby flat-leaved section of the Mexican *Sedum*-flora.

SUPPLEMENTARY NOTES TO THE HERTS FLORA.

By J. E. Little, M.A.

The following paper presents a selection of records, chiefly in the north of the county, from 1890–1916, of species for which Pryor's information was less complete, of some segregates determined in most cases by specialists since his time, and of some varieties hitherto so far as I am aware scantily or not at all recorded. The aliens which have become established are included, but a considerable number of casuals has been excluded. Where I have thought that a plant already admitted to the British Flora is in these records a casual or a weed of cultivation, I have added a note. Where no authority is cited, I am responsible for the record.

The subspecies of *Draba verna* L. are given, with some hesitation, for what they are worth. It seems quite possible that the adoption of a classification based upon simple or branched hairs is a wrong *fundamentum divisionis*. In an attempt to group various forms of *Sagina apetala* Ard., by the position and nature of the hairs, their real relation appeared to be rather obscured than assisted by the adoption of this method. If this be true of *Draba verna*, the present confusion of its sub-divisions is explained.

ABBREVIATIONS.

B.E.C.R.	Botanical Exchange Club Report.
W.E.C.R.	Watson Botanical Exchange Club Report.
A.B.	Arthur Bennett.
Coleman.	Coleman, Flora Hertfordiensis, 1849.
G.C.D.	G. C. Druce.
A.B.J.	A. B. Jackson.
H.C.L.	H. C. Littlebury, Hitchin.
R.M.	R. Morse, Hitchin.
E.S.M.	E. S. Marshall.
C.E.M.	C. E. Moss.
Pryor.	Flora of Herts, 1887.
C.E.S.	C. E. Salmon.
*	Not native.
!	Specimen seen.

Records in "Pryor" are not repeated, except for special reasons. The botanical divisions of the county are indicated by figures:— **1** = Cam; **2** = Ivel; **4** = Colne; **6** = Lea.

Thalictrum minus L., var. *collinum* (Wallr.) **1**. Royston, many near the Rifle Butts, and a few in other parts of the heath. In flower 22 June, 1907, 7 June, 1908, in fair abundance. As Pryor remarks, the heath is depastured by sheep, and I have never seen it reach the stage of mature fruit.

Ranunculus hederaceus L. **4**. In 1913 I gathered at Colney Heath both a terrestrial form and one floating in water. I thought the latter probably the form recorded by Pryor from the same locality as *Batrachium hederaceum* var. *homœophyllum*. C.E.S. however thinks that it roots too much at the joints. Pryor's record requires further investigation.

*_Delphinium Ajacis_ Reichb. **2**. In a cornfield, part of Purwell Field, Hitchin, 1910–1913, now levelled for new railway works.

*_Papaver Rhœas_ L., var. _Pryorii Druce._ **2**. Field below the Riddy Lane, Hitchin. Most large areas of poppy in this district have plants with red or coloured hairs on the peduncle and calyx. (See W.E.C.R. 1914, 482.)

Fumaria Vaillantii Lois. 2. Near Offley Grange, Hitchin. (W.E.C.R. 1914, 482.)

Barbarea vulgaris [R. Br. in] Ait. (See Journ. Bot. 1916, p. 202.)—Var. *silvestris* Fries. **2**. Purwell, Hitchin. (W.E.C.R. 1915, 525.)—Var. *campestris* Fr. **2**. Wymondley Rd., Hitchin, 1915–16.—Var. *arcuata* Fr. **2**. Purwell, Hitchin, 1915. **6**. Bet. Hertford Heath and Ware; Hertford Heath; and at Stansteadbury, Ware, 1915.

B. verna Aschers. **2**. New gravel pit, Hollow Lane, Hitchin, 1914. **6**. Nr. the Sanatorium, Haileybury Coll., 1914.

Arabis glabra Bernh. **6**. Roadside near Broadwater, 1914, R.M.

Draba verna L. (a) *D. majuscula* Rouy & Fouc. Fells' Nurseries, Hitchin, 1913, W.E.C.R. 1913, 431. (b) *D. lanceolata* Neilr. St. Ippolyts, B.E.C.R. 1913, p. 450. (c) *D. vulgaris* Rouy & Fouc. Great Wymondley; Wilbury Hill; West Mill, Hitchin, 1913. (d) *D. præcox* Stev. Fells' Nurseries, Hitchin, 1912. (e) *D. glabrescens* Rouy & Fouc. St. Ippolyts, W.E.C.R. 1913, 432; Walsworth, Hitchin, W.E.C.R. 1915, 526. (f) *D. hirtella* Fouc. & Rouy. Ickleford, B.E.C.R. 1913, 449, W.E.C.R. 1915, 525. All these localities are in District **2**.

Diplotaxis muralis DC., var. *Babingtonii* Syme. **2**. G.N.R. near Great Wymondley Rd., Hitchin, and near Grove Mill, Hitchin, 1915; Field near Arbury Banks, 1912. Probably this is a state rather than a good variety: it occurs intermixed with the typical plant.

Lepidium campestre L. **1** & **2**. Apparently rare in these districts. Bentley's records in Pryor may have been casual plants. The nearest point at which I have found it is in **6**, at Mardley Heath, 1912.

*_L. ruderale_ L. **2**. Norton Green, Stevenage, 1914, H.C.L.; Gravel pit between Great Wymondley and Willian, 1912.—**6**. On cinders, near Knebworth Golf Club House, 1909; Brickfield, Rabley Heath, 1913; Waste heap, N. of Welwyn Tunnel, in great quantity, 1911; Hoddesdon, 1915. Finches are fond of the seeds. It is apparently extending considerably upon brickfield cinders and railway ballast.

***L. Draba* L. Rapidly spreading, and a troublesome weed to the farmer. **1.** Roadside at foot of Royston Heath, 1912; Claybush Hill, Ashwell, 1911.—**2.** Field S. of Hitchin Cemetery, 1910; Clothall, 1912; near Offley Grange, 1914; E. of Purwell, Hitchin, 1915; Grove Mill, 1915.

Thlaspi arvense* L. A weed of cultivation, not now "rare" (as Coleman). **2. Purwell Field, Hitchin, 1910, 1914; S. of Hitchin Cemetery, 1911; St. Ippolyts, 1913; Langley Bottom, 1912.—**6.** Near High Leigh, Hoddesdon, 1912.

Viola hirta × *odorata* = (× *permixta* Jord.). **1.** Near Church Hill, Royston Heath, 1911, det. A.B. Mrs. E. S. Gregory, who has determined all the Violets except where otherwise indicated, remarks: "This plant answers to the description of *V. multicaulis* Jord., but does not agree with a dried specimen from him in Herb. Mus. Brit."

V. hirta L., var. *fraterna* Reichb. **1.** Royston Heath.

V. silvestris Kit. **2.** Hitch Wood, 1914.

V. silvestris var. *punctata* Druce. **2.** Chisfield, 1912; (Offley Holes and Charlton, Hitchin, J.E.L.).—**6.** On the Spital Brook, near Cowheath Wood, 1912.

V. Riviniana Reichb., var. *diversa* E. S. Gregory. **6.** Mardley Heath, 1911, and Codicote High Heath, 1912.—*forma nemorosa* Neuman. **2.** Hitch Wood, B.E.C.R., 1914, 122; (Knebworth Great Wood; West Wood; Ley Green, J.E.L.). Plants approaching *forma villosa* Neuman, Hitch Wood and Offley Holes, 1914.

V. canina L. **2.** Burleigh Meadows, Langley, near Hitchin, 1914.—Var. *ericetorum* Reichb. **4.** Colney Heath, 1911.—Var. *pusilla* Bab. and var. *sabulosa* Reichb. **6.** Codicote High Heath, W.E.C.R. 1912, 384.

Polygala serpyllacea Weihe. **6.** Hertford Heath and Roman Road W. of Hoddesdon Bury, 1914.

Silene latifolia Rendle & Britten, var. *puberula* (Jord.). **2.** W. of Clothall Bury, 1912; near Benslow Bridge, Hitchin, 1912; between Preston and Gosmore, 1914.—**6.** Codicote High Heath; Welwyn, 1912.

S. noctiflora L. **2.** Not now "rare" (as Coleman). Purwell Field, Hitchin, 1910, 1913; E. of Lilley, 1913; Benslow, Hitchin, 1914.

Lychnis alba × *dioica*. **6.** Copse N. of Broxbournebury, 1912.

Moenchia erecta Gaertn. **6,** Barren pasture N.E. of Goldings Wood, Hertford Heath, 1914; Roman Road, near cross road from Hoddesdon to Monk's Green, 1913; Roadside near Mardley Heath, 1913.

Stellaria umbrosa Opiz. **6.** Park Wood, Bramfield, W.E.C.R. 1915, 530.

Arenaria tenuifolia L. **2.** Gravel pit, Wilbury Hill, B.E.C.R. 1912, 236, and W.E.C.R. 1914, 486. Cultivated ground along the Hitchin to Hexton road, extending for three-quarters of a mile on either side of High Down: like *Ajuga Chamæpitys* in the same area, its appearance or absence depends on the crop cultivated. In W.E.C.R. 1912, E.S.M. says of the specimens then distributed: "They agree better on the whole with Rouy and Foucaud's description of *Alsine tenuifolia* Crantz, *β. laxa* Willk. than with their *α. Vaillantiana* DC.; but the petals are at least half as long as the sepals, instead of being 'très courts ou nuls.'" C.E.S. (*ibid.*) concurs, and *in litt.* suggests "could not this be var. *laxa* Jord.?" Coarse ballast on G.N.R. siding to Grove Mill, Hitchin, W.E.C.R. 1914, 128. **6.** Railway embankment between the tunnels at Welwyn, and in a meadow on the E. side, 1913.

Claytonia perfoliata* Donn. **2. Fells' Nurseries, Hitchin, 1913.

Montia fontana L. **4.** Colney Heath. "This is to me var. *chondrosperma* Fenzl = var. *minor* Gmel. *pro parte*" C.E.S. *in litt.*—**6.** Roadside moistened by road drainage between Mardley Heath and Welwyn, 1914.

Hypericum Androsæmum L. **6.** Roadside W. of Broxbournebury, 1914.

Linum usitatissimum* L. **2. Corner of a field E. of Offley Grange, with white flowers, 1913; Gravel pit, Riddy Lane, Hitchin, 1913, F. Ransom; between Grove House and Wilbury Hill, 1913.

Geranium pratense L. **2.** A large colony of plants well established in a meadow under Five Barrow Hill, Hitchin, probably spread from the garden of "Foxholes," a quarter of a mile away, H. F. Hardwick, 1913.

Rhamnus Frangula L. **6.** Bulls Green, Datchworth, 1911.

Medicago arabica Huds. **2.** Meadow near "Foxholes," Hitchin, 1914, F. R. Tindall Lucas; Between Grove Mill and the Icknield Way, R.M. 1915. In both cases probably introduced with "seeds."

Melilotus alba* Desr. **2. Gravel pit, Riddy Lane, Hitchin, 1911; Lane N. of West Mill, Hitchin, 1912; Field near Wymondley cross roads, 1914.

M. indica* All. Has become much more common since Pryor's time. **2. West Hill, Hitchin, 1910; Benslow and Purwell Field, 1912; Grove Mill chalk pit, Hitchin, 1912; Between Purwell and Willian, 1912; Field on Great Wymondley Rd., Hitchin, 1914; Field between Offley Grange and Welbury, 1914.—**6.** Waste heap N. of Welwyn Tunnel, 1913.

Trifolium ochroleucum Huds. **2.** Clay pasture ¾ mile N.N.W. of Great Wymondley, 1914; The Broadway, Letchworth, 1915, R.M.

T. procumbens L., *α. majus* Koch. **2.** G.N.R. near Great Wymondley, 1913, det. C.E.S.

Lotus tenuis Waldst. & Kit. **2.** Offley Holes, 1913; Offley Hill, B.E.C.R. 1914, 136; near Great Wymondley, 1913–16.

Vicia gracilis Lois. **2.** Field adjoining Icknield Way, Letchworth. H.C.L. 1916!

Lathyrus latifolius* L. **2. Long established in chalk pit at Hitchin station, 1913.

Prunus insititia L. **2.** Hedge between Ash Brook Cottages and Wymondley cross roads, 1916, det. A.B.J.; Hedge between White Hill and The Folly, Hitchin, 1916.

P. domestica L. **2.** Not now rare. Hedge, Great Wymondley

Rd., Hitchin, 1915; Thicket, edge of *Trifolium ochroleucum* field, Great Wymondley, 1916; Near Walsworth on road to Willian; Between Norton and Norton Mill, 1912; Near Newnham; Lane near Charlton, H.C.L.!; all the preceding at some distance from houses; Highbury, Hitchin, a slightly spinous form, 1916.

P. Cerasus L. **2.** N. side of West Wood, Offley Holes, W.E.C.R. 1914, 490; Wood near Tilekiln Farm, Weston, M. R, Pryor, 1912!

Potentilla mixta Koch. **6.** Frequent about Hertford Heath, W.E.C.R. 1913, 440; Roadside near 'College Arms'; Roman Road near Spital Brook, 1914; Cox's Walk gravel pit, Broxbournebury, 1915.

P. Anserina L. (*a*) *concolor* Wallr. **2.** Tatmore Hill, Preston; Near Grove House, Hitchin; Oughton Head, 1910; Offley Bottom Farm, 1914.—**6.** Park Wood, Bramfield, 1912. (*β*) *discolor* Wallr. **2.** Offley Bottom Farm, 1914; Lane between Purwell and Nine Springs, Hitchin, 1914; Near Ickleford Church, 1913.—**6.** Near Monks Green, 1913.

Alchemilla vulgaris L., var. *minor* Huds. **2.** Hitch Wood, 1911; Between Little Hill End and Shilley Green, 1912; N. side of West Wood, Offley Holes, 1914.—**4.** Lower end of Colney Heath, 1913.—**6.** Near Crouch Green, Knebworth, 1911; Near the footpath from Shephall to Aston, 1912; Box Wood, Stevenage, 1911, B.E.C.R. 1911, 83; Roadside between Sacombe Green and High Cross, 1912.

Rosa tomentosa Sm., aggr. Sub-group '*Fœtidæ*' Wolley-Dod. **2.** Tingley Wood, W.E.C.R. 1914, 498.—**6.** Calais Wood, Bayford, "near var. *fœtida* Bast," W. Barclay; George's Wood, Bell Bar, "Probably intermediate between the '*Omissæ*' group and the '*Fœtidæ*,'" W. Barclay.

Epilobium palustre L. **2.** Walsworth Upper Common, 1912; St. Ippolyts Common, 1914.

Bupleurum rotundifolium* L. **2. One mile W. of Newnham, 1914, R.M.!

Carum segetum Benth. & Hook. fil. **2.** Base of Wilbury Hill, 1912; Between Nine Springs and Great Wymondley, B.E.C.R. 1912, 255; Between Offley Bottom and Offley Grange, 1913; near Highover Farm, Hitchin, 1914; In several fields S. of High Down, 1914; a quarter of a mile N.E. of Purwell Mill, Hitchin, 1914. See W.E.C.R. 1914, 496.—**6.** Bank near allotment gardens N.E. of Ware, 1914.

Anthriscus Cerefolium* Hoffm. **6. Little Amwell, 1914.

Peucedanum sativum Benth. & Hook. fil. **2.** Norton Common, a form with much dissected leaflets, W. P. Westell, 1915!

Heracleum Sphondylium L., var. *angustifolium* Huds. **2.** Near Foxholes, Hitchin, 1915; Offley Holes, 1915. The extreme form is scarce in the district.

Sambucus Ebulus L. **2.** Half a mile S. of Symons Green, Stevenage, on both sides of the road, R.M. 1914!; Near Weston, 1915, R.M.

Galium erectum Huds. **1.** Near Church Hill, Royston Heath, 1913.—**6.** Gravel pit between Woollen's Brook and Hoddesdon, 1912.

G. palustre L. var. *Witheringii* (Sm.). **2.** Pond S. of Dye's Farm, Langley, 1912, det. G.C.D.

G. uliginosum L. **2.** Swamp between Grove Mill and Hyde Mill, 1910; St. Ippolyts Common, 1914.

Sherardia arvensis L., var. *maritima* Griseb. **2.** Near Grove Mill; High Down; Pirton; Pirton cross roads, B.E.C.R. 1912, 257.

Valeriana Mikanii Syme. **2.** Between Charlton and Offley Holes, 1912; E. edge of Offley Park, 1913.

V. sambucifolia Mikan. **2.** Watery Grove, Norton Green; Knebworth Great Wood, 1911; Langley Bottom, 1912.

Dipsacus pilosus L. **2.** Plantation at Purwell, Hitchin (Coleman's record). Still there, 1913, R.M. No other station in the Ivel district is known to me.

Erigeron canadensis* L. **2. In sainfoin, near Pirton cross roads, 1912; Near West Mill, Hitchin, 1912.—**6.** Over Welwyn N. Tunnel, 1912.

E. acris L. Not now rare in N. Herts. **1.** Royston Heath.—**2.** G.N.R., abundant on main line from Wymondley to Cadwell, and on Cambridge branch, near Grove Mill, 1912; Near Norton Common, 1908; Between Holwell and West Mill, 1912; Offley Holes, 1913.—**6**. Mardley Heath, 1912.

Antennaria dioica Gaertn. **1.** Three patches on Royston Heath, 1895–1914.

Gnaphalium silvaticum L. **2.** Barren pasture near Little Hill End, 1913; Near West Wood, H.C.L. 1913.—**6.** E. Herts Golf Course, Ware; Harmer Green Wood, H.C.L.

Anthemis arvensis L. **2.** Near Offley Grange, B.E.C.R. 1913, 473, W.E.C.R. 1914, 497; Oakfield, Hitchin, 1913; Near Wilbury Hill, 1912; Near High Down, 1894 and 1913; Gaping Hill, Hitchin, 1895; Near Bury Mead, Hitchin, 1895; Chapelfoot, Preston, 1910; St. Ippolyts, 1913.

Matricaria Chamomilla L. **2.** Waste ground near M.R. Goods Yard (casual); St. Ippolyts, W.E.C.R. 1914, 498.—**6.** Half a mile S. of Symons Green, Stevenage, 1914; Between Norton Green and Langley, H.C.L. 1914.

M. suaveolens* Buch. **6. Hertford Heath; Near Ware; Near Hertford Workhouse; Between Hertford and Bramfield; Near Hertingfordbury; Lodge Hollow Gravel pit, Broxbournebury; all 1912; Gravel pit, Essex Rd., and Roseland Nurseries, Hoddesdon, 1915. In Beds, at Gamlingay, but not yet seen in N. Herts.

Tanacetum vulgare L. **2.** Margin of field on Riddy Lane, Hitchin, 1912; near Foxholes, and near West Mill, Hitchin, 1915, H.C.L. Very scarce in N. Herts, but abundant at Shefford, Beds.

Artemisia Absinthium L. **2.** Between Wilbury Hill and Grove Mill, 1908, H. F. Hardwick; Waste ground near the Herts Bacon Factory, Hitchin, 1913; Waste ground, Fells' Nurseries, Hitchin, 1916.—**6.** Waste heap N. of Welwyn Tunnel, 1912. All casuals?

Petasites fragrans* Presl. **2. Letchworth Lane, 1913; Priory Park, Hitchin, near the Charlton Lodge, 1915.—**6.** At the back of Haileybury Coll. 1912; S. of Hatfield, between road and railway, 1912.

Cnicus pratensis Willd. **2.** Burleigh Meadows, Langley, 1910.

Cnicus arvensis Hoffm., var. *setosus* (Bess.). **2.** Waste ground near M.R. Goods Yard, Hitchin, W.E.C.R. 1914, 499.

Silybum Marianum* Gaertn. **2. Among swedes, near Old Welbury Farm, Hitchin, but far from houses, 1913.

Serratula tinctoria L. **2.** Near Old Welbury Farm, 1910–16.

Centaurea Jacea* L. **6. Waste heap N. of Welwyn Tunnel, 1913. "*Cf.* subspec. *jungens* Gugler, var. *fimbriatisquama* Gugler," A. Thellung, B.E.C.R. 1913, 476.

C. solstitialis* L. **2. In lucern near The Folly, Hitchin. (See B.E.C.R. 1913, 476.)

Crepis biennis L. **2.** In rough grass at "The Cottage," Great Wymondley Rd., Hitchin, 1910. Casual?

Hieracium maculatum Sm. **2.** Weston Hills, a quarter of a mile up the road from Baldock to Weston, 1911.

H. sciaphilum Uechtr. **2.** On the M.R. near Snailwell Farm, Ickleford, 1913, det. J. Cryer.—**3.** Datchworth (var. *transiens* Ley? E.S.M. in B.E.C.R. 1911, 105); Roadside between Bramfield and Bulls Green, 1911.

H. boreale Fr. **2.** Newton Wood, Langley. (Var. *Hervieri* Arvet-Touvet? E.S.M. in B.E.C.R. 1911, 105.)

Taraxacum palustre DC. aggr. **2.** Burleigh Meadows, Langley, 1911, det. C.E.M.; Oughton Head, Hitchin, 1913.—**4.** Colney Heath, 1913.

Lactuca virosa L. **2.** "North Road, 2½ miles N. of Baldock, by the turning to Caldecote" Coleman. Same place, 1914, R.M.!; Hitchin station chalk pit, 1914.

L. muralis DC. **2.** Great Wymondley, 1912–16. Very scarce in the district.

Tragopogon porrifolius* L. **2. Gravel pit, Nuns Close, Hitchin, 1912–16.

Campanula rapunculoides* L. **2. Cultivated ground, Mount Pleasant, Hitchin, 1890–1914; Gaping Hill, Hitchin, 1893; Fells' Nurseries, Hitchin, 1916; Gravel pit, Hollow Lane, Hitchin, 1914.

Monotropa Hypopitys L. **1.** Plantation near Church Hill, Royston Heath, C.E.M. 1912.—**2.** Fir plantation, Minsbury Hill, Offley Park, H. F. Hardwick, 1910; Offley Park, above lodge on Hitchin road, F. R. Tindall Lucas, 1914; Offley Holes, R.M. 1914 (*a. glabra*!).

Anagallis arvensis L., var. *carnea* (Schrank). **2.** Wilbury Hill, 1912.

Cynoglossum officinale L. **2.** Outside S.E. corner of Tingley Wood, 1912.

Symphytum peregrinum Ledeb. **2.** Near Purwell, Hitchin, 1908.—**6.** Near Lemsford Mills, 1909, det. C. Bucknall; On cross road from Woollen's Brook to High Leigh, Hoddesdon, 1910, det. C.B.

Lycium chinense* Mill. **2. Now quite frequent in hedgerows near gardens. The Folly, Kershaw's Hill, Blackhorse Lane, near the 'Highlander,' and Nine Springs, Hitchin.

Atropa Belladona L. **2.** Hedgerow between Grove Mill and Hyde Mill, 1912; Edge of Walsworth Common, 1912; Chalk pit.

Hitchin Station, 1914; Hedgerow near Oakfield, 1913; Grove Mill Chalk Pit, in fair quantity. Probably bird-sown in all the preceding stations, except at Grove Mill, to which it may have been intentionally introduced. As the plant is cultivated in the district, it is doubtful whether any of the stations are truly native.

Verbascum Lychnitis L. **2**. Chalk pit, Hitchin Station, 1914, conf. G.C.D.

Linaria repens Mill. **2**. G.N.R. embankment near Benslow Bridge, Hitchin, B.E.C.R. 1913, 485, now covered up; G.N.R. between Letchworth and Baldock, 1916, W. P. Westell. In the same place a few plants of *L. repens* × *vulgaris*, R.M., 1916.

Veronica montana L. **2**. Westbury Wood, Offley, 1914.

V. Anagallis L. **2**. Oughton Head, Hitchin, 1912; Blackhorse Mill, Baldock, 1914. Var. *glandulosa* Druce (B.E.C.R. 1911, 26, and Supplement, 317).—**2**. Confluence of Ash Brook and St. Ippolyts Brook, Hitchin, B.E.C.R. 1912, 271, W.E.C.R. 1913, 451 (*forma annua*?); a quarter of a mile farther up the Ash Brook, 1913 (perennial); Ivel Springs, Baldock, 1914 (*forma annua*?).

V. aquatica Bernh. (see B.E.C.R. 1911, 27). **2**. Cadwell Common, 1912; River Hiz, near Ramerwick, 1914.

Euphrasia borealis Towns. **2**. Meadow near Welbury Farm, Hitchin, 1911, det. C. Bucknall.

E. nemorosa H. Mart. **2**. Chalk Hill, Offley, 1912, det. C. Bucknall; Icknield Way near Lilley Hoo, 1911.

Bartsia Odontites Huds., var. *serotina* (Dum.). **2**. Offley Holes; Offley Grange; Offley Bottom Farm, 1914.

Thymus ovatus Mill. **2**. Near Tingley Wood, Hitchin, 1912 ("under subvar. *subcitratus* mihi, inflorescence elongated = *T. subcitratus* Schreb." A. B. J.); Oughton Head, Hitchin, 1912; Hill End, 1912; Wilbury Hill, 1912; Burleigh Meadows, Langley, 1910; Little Almshoe.—**6**. Over Welwyn Tunnel.

T. Serpyllum L. **1**. Royston Heath, 1913 ("on the whole, nearest to subvar. *angustifolius*, mihi, = *T. angustifolius* Pers." A.B.J.).

Salvia verticillata* L. **6. Mardley Heath, gravel pit, B.E.C.R. 1911, 114; same place, 1914–15, H.C.L.

Marrubium vulgare L. **2**. Nine Springs, Hitchin, on garden ground, 1914; Kershaw's Hill, Hitchin, 1914; Fells' Nurseries, Hitchin, 1916. All the stations suggest a weed of cultivation.

Stachys arvensis L. **2**. Cornfield between High Down and Lower Plantation, 1912. Very scarce in the district.

S. annua* L. **2. Cornfield at Walsworth between the roads to Willian and to Baldock, 1914; Mount Pleasant, Hitchin, F. R. Tindall Lucas, 1915!

Galeopsis Ladanum L. (aggr.). As to an interesting form in district **2** see B.E.C.R. 1912, 276 & W.E.C.R. 1913, 454.

G. Tetrahit L., var. *bifida* (Bœnn.). **6**. Harmer Green Wood, over the North Tunnel, Welwyn, 1912, det. A. Thellung, 1914.

Lamium hybridum Vill. **2**. Now fairly frequent. Field S. of Hitchin Cemetery, 1912; London Rd., under Almshoe Bury; Between Oakfield and Ash Brook, 1913; Near West Mill, Hitchin, 1913;

Between Oakfield and St. Ippolyts, 1912; In lucern, between Purwell and Great Wymondley, 1915.—**6**. Mardley Heath, 1912.

L. maculatum* L. **1. Roadside near Sandon Rectory, 1913.

Ballota nigra L. **2**. Plants with white flowers, and more softly pubescent are not infrequent. Hollow Lane, Hitchin, 1914; Mount Pleasant, Hitchin, 1915; Near Nine Springs, 1912.

Chenopodium ficifolium Sm. **2**. Oakfield, Hitchin, B.E.C.R. 1914, 158.

Atriplex patula L., var. *erecta* Lange, *forma serrata*, Moss & Wilmott. **2**. Cornfield, Oughton Head, Hitchin, 1910, det. A. J. Wilmott. Var. *linearis* M. & W.—**2**. Purwell Field, Hitchin, 1914, det. A. J. W.

A. hastata L., var. *deltoidea* Moq., form 2, M. & W. **2**. Allotment gardens, Baldock, det. A. J. W.

Polygonum Convolvulus L., var. *subalatum* Lej. & Court. **2**. St. Ippolyts, 1914.—**6**. Harmer Green Wood, 1912.

P. minus Huds. **6**. Goose Green, Hertford Heath, B.E.C.R. 1913, 494. (Var. *erectum* Rouy?)

P. maculatum Trim. & Dyer. **2**. St. Ippolyts, 1914.—**6**. Burnham Green, B.E.C.R. 1913, 494; Goose Green, Hertford Heath, 1912.

P. amphibium L., var. *terrestre* Leers. **2**. Purwell Field, Hitchin, 1912–16, but seems never to flower.—**6**. Welwyn, in flower, 1916, H.C.L.!

Daphne Laureola L. **1**. Spinney E. of Five Barrow Hill, Royston Heath, 1911.—**2**. Wood between Purwell and Willian, 1912; Offley Holes, Hitchin, 1913; 1 mile N.N.W. of Baldock, 1914.

Mercurialis annua L. **2**. Spontaneously in garden, Wymondley Rd., Hitchin, 1916, casual, otherwise no record in 27 years.—**6**. Waste heap N. of Welwyn Tunnel. 1912.

(To be concluded.)

BIBLIOGRAPHICAL NOTES.

LXVII. MRS. MORIARTY'S "VIRIDARIUM."

In the new edition of the *Biographical Index of British and Irish Botanists*, which—involving as it has done far more work than the compilers had anticipated—will, it is hoped, be completed by the end of the present year, considerable modifications of plan—the result of mature deliberation—will be introduced. These include the withdrawal, for various reasons which will be duly stated in the Introduction, of many names which appear in the existing edition, which will thus possess an interest of its own, although it is hoped that everything of real importance will be retained in the new issue. Among the features which will be retained, however, is the inclusion of everyone who has published a book, however trivial and even useless such a book may be. In most cases, such works are entered in Pritzel's *Thesaurus* and Dr. B. D. Jackson's *Guide*, which in itself gives them some claim to insertion; and although the present writer personally regrets the decision, he feels that the retention may be justified. In some cases the compilers have not actually seen the book which, in still more, constitutes the sole claim of the author to insertion, no biographical information regarding him (or her) having been procurable. In cases where such a book has been seen, it has sometimes been possible to gather from the inspection facts regarding its production which cannot well be indicated in the *Index* and are indeed in themselves of little importance, yet which it may be well to place on record in an accessible form.

An instance of the kind indicated will be found in the book named at the head of this note. Of the author, Mrs. Henrietta Maria Moriarty, we know nothing beyond what may be gathered from the *Viridarium* except that in 1812 she published in London "*Crim. Con.*: a Novel founded on Facts," the title is hardly what would have been expected from an author who seems to have been engaged in educational work. One of the "subordinate objects" of the *Viridarium* was its "use in public boarding-schools" where "those who have the instruction, or, I might say, the formation, and even the fashioning of young minds most at heart, often find it difficult to obtain representations in this most pleasing branch of natural history; on the one hand sufficiently accurate and on the other, entirely free from those ingenious speculations and allusions which, however suitable to the physiologist, are dangerous to the young and ignorant; for this reason I have taken as little notice as possible of the system of the immortal Linneus, and of all the illustrations and comments on it; nay, I have not once named the fanciful Dr. Darwin, and, having no desire to extenuate the merit of any writer, or to supercede (*sic*) the use of his labour, it will be pleasure and satisfaction enough for me if my own performance shall prove such an one as the rising generation can consult with safety and advantage."

The full title of the book—which was "printed for the author, and sold by William Earle, no. 47, Albemarle-Street, Piccadilly"—runs: "Viridarium: Coloured Plates of Greenhouse Plants, with the Linnean Names, and with Concise Rules for their Culture." It is dedicated (from Boley Hill, Rochester, Jan. 1805) to the Dowager Lady de Clifford as a "testimony of high respect and of gratitude for kindness to me and my children"; there is a long list of subscribers, headed by "His Royal Highness the Duke of Sussex, 2 copies," the constitution of which confirms the view that Mrs. Moriarty had been a governess in families of position. A second edition with a different title—*Fifty Plates of Greenhouse Plants*—was published in 1807, by J. W. Little, London.

Although Mrs. Moriarty speaks in her dedication of "the time spent in executing this work" and, in the preface, of having "delineated" the plants, the plates have in almost every case been adapted with slight alteration and with no sort of acknowledgement from *Curtis's Botanical Magazine*. I have not checked each one, but have compared a sufficient number to warrant this conclusion; the correlation of t. 11 (*Cereus flagelliformis*), t. 14 (*Convolvulus althæoides*), and t. 26 (*Hibiscus speciosus*) with tt. 17, 359, and 360 of Bot. Mag. will exemplify this statement. The only exception (and the only one in which the author refers to "the plant from which this drawing is taken") is t. 3 (*Aloe variegata*), which does not correspond with the representation of *Aloe variegata* in Bot. Mag. (t. 513). The letterpress of the *Viridarium* is of the scantiest description; the spelling of many of the names shows that Mrs. Moriarty was unfamilar with them; thus *Jatropha* appears in the text as "Satropha" and in two indexes as "Saphora." JAMES BRITTEN.

SHORT NOTES.

WILLIAM ANDERSON AND COOK'S THIRD VOYAGE. The following notes supplement in two particulars the paper published in the December number of this Journal (pp. 345–352).

1. On p. 347 I expressed some doubt as to the provenance of the notes from Anderson's Journal which form so important a portion of the account of the voyage. This doubt is set at rest by a passage in the Introduction to the account of the Third Voyage (vol. i. p. lxxviii) which I had overlooked, and which states definitely that "by the order of Lord Sandwich"—then Secretary to the Admiralty—Anderson's Journal "was put into the hands of the Editor, who was authorized and directed to avail himself of the information it contained." The Introduction goes on to state that "the copy of the first and second volumes, before it went to press, was submitted to Captain King" and "had been read over and corrected by one so well qualified to point out any inaccuracies." This disposes of my tentative suggestion that King edited the volumes and wrote the Introduction, but I have not been able to ascertain who did.

2. I have found in the Department of Botany a drawing in colour of *Pringlea*, by S. Webber—the artist who accompanied the voyage and of whom the little that is known is printed in a footnote to p. 346. The drawing is endorsed: "Kurguelans [*sic*] Land, Lat. 48^{d}–41^{m} South"; it represents the plant in its early flowering stage and is very well executed. The figure, apart from its scientific interest, is of value as being, so far as I know, the only existing specimen of Webber's botanical work, apart from his copies of Gordon's drawings referred to in the note mentioned. It is signed "S. Webber del." with the date 1777.—JAMES BRITTEN.

ANGLESEA LICHENS. In the paper by Mr. Wheldon and myself on "The Lichens of South Lancashire" (in Journ. Linn. Soc., Botany, xliii. 87–136, Oct. 1915) we gave a somewhat detailed account of the lichens of the sand-dunes of the South Lancashire coast. During a visit, in June 1916, to the sandhills at Newborough, in Anglesea, I was therefore naturally interested in the lichens of that tract of dunes, and so far as the comparatively limited time at my disposal permitted, made a special search for some of the rare and new species which had been located on the Lancashire dunes. A comparison of the lichen floras of the two coasts was of particular interest to me. Up to the present the material collected has not been fully worked out, but in the meantime it may be well to put on record here the occurrence in

Anglesea of at least two species which were originally discovered on the dunes of Lancashire. The first of these is *Arthopyrenia areniseda* A. L. Sm., first discovered by Mr. Wheldon on the Lancashire coast, and described as a new species by Miss Smith in Journ. Bot. 1911, p. 42. This plant I found growing in the Newborough sandhills on exactly the same peculiar type of ground as in the Lancashire dunes, and accompanied by many of the same associates. It was fruiting well. I also sought for *Bacidia latebricola*, described in our aforesaid paper, p. 127. In the Lancashire sandhills it grows on thin dry lawns, on broken sandy dune-banks overhung by herbage; it is consequently easily overlooked unless specially sought for. A search in the Anglesea locality, in a habitat of this kind with which I was familiar, proved successful. Apothecia were, unfortunately, not found; but from the colour and other characters of the thallus and the characteristic habitat I have no doubt as to the identity of the plant. The discovery of these two lichens in Anglesea considerably extends their known range of distribution, and they constitute notable additions to the lichen flora of vice-county 49.—W. G. Travis.

Carex basilaris Jord. (Journ. Bot. 1916, 141, 246). The Spanish specimen gathered by me on Tibidabo near Barcelona was determined by Kükenthal; it gives an interesting increase in geographical range. The specimen from Mont d'Oiseaux, Hyères, for which Department (Var) it is already recorded, was first named *C. basilaris*, but was subsequently corrected in my writing (probably on the authority of Kükenthal) to the allied *C. Halleriana* Asso; both specimens are preserved in the Fielding Herbarium in the University of Oxford (but they had been put into the wrong covers and I have only recently found them), to which almost all my foreign specimens are given, including my set of Greek plants which have recently been examined by Mr. C. C. Lacaita. My secretary, who was with me when both sedges were gathered, is called up, and therefore I am at present unable to put my hands on Kükenthal's letters of that period, now twelve years ago.—G. C. Druce.

Calamintha nebrodensis Kern. in Greece. On Pentelicon near Athens in 1914 I gathered a Labiate which was evidently closely allied to *Calamintha alpina* of the Alps and yet which was not identical with my Swiss specimens. Mr. C. C. Lacaita kindly examined it and refers it to *C. nebrodensis* Kern., which takes its name from the Nebrodensian mountains between Palermo and Messina in Sicily. I believe it is new to Greece. The plant from Mount Olympus which appears as *Thymus alpinus* in Sibth. & Sm. Comp. Fl. Græc. i. 420 is also the same form, which is put as a subspecies—*C. meridionalis*—under *C. alpinus* by Nyman (Consp. Fl. Europ. 589).—G. C. Druce.

"A Famous Botanist."—Mr. J. Ardagh writes to us from Dublin: "There is a sandstone tablet in the porch of St. Lawrence's Church, Allington, Kent, with the inscription—'In memory of James Drayton a Famous Botanist of Maidstone who was buried in this Churchyard 11 Sep. 1749.'" He is not mentioned in the *Flora of Kent*: is anything more known of him?

REVIEWS.

Flora of County Kerry. By REGINALD W. SCULLY, F.L.S. With six plates and a map. Pp. lxxxi, 406. 8vo. Dublin: Hodges, Figgis, & Co., Ltd., 1916. Price 12*s.* 6*d.*

THE author is to be heartily congratulated on the completion of this important work, which deals with the flowering plants and higher cryptogams of a large county (1853 square miles), containing the highest hills in Ireland, and producing many species of exceptional interest. He has explored it carefully for over twenty-five years; indeed, no book of the kind that I know shows plainer signs of intimate acquaintance with the area treated of, and its vegetation. Mr. Colgan's *Flora of County Dublin* (1904), published by the same firm, has been taken as a model, though the present volume is somewhat larger; his help. and that of other botanists, is handsomely acknowledged. The print, paper, and binding are excellent; and the map, though perhaps on rather a small scale, is quite clear.

A very full Introduction, under nine heads, gives all needful details, and must have involved a vast amount of hard work. In the history of the Flora, beginning with a MS. mention of *Arbutus* and the Oak at Killarney, about 1584, the gradual progress in botanical knowledge is traced. A discussion of the physical features—coastline, islands, mountains, lakes, and rivers—leads on to a geological sketch; severe glaciation is indicated in the mountainous southern parts. The climate, "moist, mild, and changeable," accounts for some floral peculiarities. "There can be but little doubt that there are localities in the south and west of Kerry which receive the largest rainfalls in Ireland"; Mangerton, at 1760 feet, had an average of 97·40 inches during fifteen years, with a maximum of 140·9. The mean temperature for January at Valencia, 44·5 deg. F., equals that of Hyères, Cannes, and Mentone.

The characteristics of the Flora have received particular attention. Of about 1150 native or naturalized Irish species and subspecies, 840 occur in Kerry. Dublin, less than a fifth of its size, almost equals this number, but lies much nearer to England and has twice as much cultivated land in proportion, with a drier atmosphere favouring the establishment of colonists or aliens. The percentage of *Cyperaceæ*, *Filices*, and *Naiadaceæ* in Kerry is 15·36, against 11·61 in Dublin, 9·28 in Kent, and 3·82 in Europe. A comparative scarcity of maritime plants may be due to the prevalence of strong Atlantic gales. Watson's "Germanic" type has only five Kerry representatives (of these, *Hippophae* has been planted, and *Carex Boenninghausiana* is a hybrid); but the county possesses 54 of the combined "Scottish" and "Highland" types, as compared with Wicklow's 36. Here are the headquarters of six remarkable Irish species:—*Saxifraga Geum*, *S. umbrosa*, *Arbutus*, *Pinguicula grandiflora*, *Sisyrinchium angustifolium*, and *Juncus tenuis*; the last two (American) Mr. Scully believes to be true natives in the county, and no one has had better opportunities of judging. *Sibthorpia*, *Utricularia Bremii*, *Simethis*, and **Nitella confervacea*, together with *Epipactis atroviridis*, *Carex hibernica*, several *Hieracia* and *Rubi*, and the introduced *Polygonum sagittatum*, are at present unknown elsewhere in Ireland. Over 26 per cent. of Irish rarities occur here. Notes on the influence of soils, with a list of calcicole and a much longer one of calcifuge kinds, come next; of the second group, it is noted that *Saxifraga umbrosa* and *Erica cinerea* occasionally grow on bare limestone rocks. The vertical range of the species is discussed at considerable length, as being "a subject of more than local interest," in the present case. No fewer than 48 lowland plants ascend to over 3000 feet, of which 20 reach the summit of Carrantuohill, on the Reeks (3414 feet). For the division of the county for botanical purposes—a natural arrangement, based on physical features, being impracticable,—the nine Baronies have been taken as districts; each is described, and its peculiarities are pointed out.

The sequence and nomenclature are those of *Cybele Hibernica* (2nd edition) and *Irish Topographical Botany*, as likely to be most useful to Irish readers; but the synonyms now in general use are added. Only *real* English names have been (most wisely) adopted. The vertical range of all species known to ascend above 500 feet is given in the text. Aliens are included; but casuals of only one year's standing have, as a rule, been ignored. A list of books, papers, MSS., etc., ends the preliminary matter.

The author, though he takes critical plants fully into account, seems to be a "lumper" rather than a "splitter"; the scheme of the book (see above) may partly account for this.

A very valuable contribution to botanical knowledge is the new light shed in these pages on the *Robertsonia*, or "London Pride," section of Saxifrages. Where *S. umbrosa* grows alone, it is usually more or less constant; but wherever it is accompanied by *S. Geum* the mutability becomes very great. From Bree's time onwards, almost all careful observers have suspected that hybrids and mongrels were frequent, *S. elegans* Mackay being the most obvious case. The matter is further complicated by the polymorphism of *S. umbrosa* and *S. Geum* themselves in Kerry and Cork. *S. hirsuta* L. had hitherto been regarded by some as a species, by others as a subspecies, or variety, or hybrid of the latter; but no actual proof existed. This has now been furnished through a ten years' course of experiments which Professor Dixon carried out in the garden at Trinity College, Dublin. Kerry examples of *S. Geum* and *S. umbrosa* were first self-fertilized. and similar products were then crossed; this resulted in specimens being raised, among other forms, which fully complied with the Linnean description of *S. hirsuta*. Self-pollination of *S. hirsuta* from Torc Mountain, Killarney, gave rise to an offspring partly resembling it, besides forms of *S. Geum* and *S. umbrosa*, with several remarkable variants. The six plates give 139 photographic reproductions of natural and artificial leaf-forms, practically covering the whole group. The author believes that *S. Geum* is a decreasing species in Kerry; and its discovery by Mr. R. Lloyd Praeger on Clare Island, Co. Mayo, suggests that it may have died out in other parts of western Ireland. *S. stellaris* is considered to be the most common alpine plant in the county, descending to less than 450 feet.

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* Found last year in E. Donegal by Rev. Canon Bullock-Webster (*Irish Naturalist*, 1917, p. 4, as *N. Nordstedtiana*).

The account of the Hypnoid Saxifrages is too vague. They are all here grouped under *S. decipiens*, which Ehrhart failed to describe, though he issued it as No. 5 of his Exsiccata; *S. rosacea* Moench appears to be the valid name. It does grow very sparingly on Brandon Mountain, and probably elsewhere; but the prevailing Kerry species is *S. hirta* Sm. This has been strangely confused with *S. Sternbergii* Willd., the typical form of which occurs on and near the top of Brandon. What has been named *S. groenlandica* L. by Engler from Kerry does not agree with the figure and description of Dillenius's *Saxifraga tridactylites groenlandica* (on which the Linnean species was based), in the *Hortus Elthamensis*; it is *S. incurvifolia* D. Don, apparently confined to Ireland. I have had these three Brandon plants in cultivation for over five years, together with Mr. Praeger's Clare Island *S. rosacea*; they keep thoroughly distinct, in all stages of growth. *S. affinis* D. Don does not seem to have been met with recently in its original station; and true *S. hypnoides* L. is absent from Kerry.

Nuphar intermedium Ledebour is recorded from one locality (Lough Acoose, Glencar), and has also been obtained in Westmeath; Caspary considered this to be a hybrid between *N. luteum* and *N. pumilum*, which is not Irish. *Arabis ciliata* Br., to be found on nearly all the sandhills and sandy pastures of the Kerry coast, is ably and impartially discussed; the author, after many years' observation, inclines to consider it as an extreme sea-side variety of *A. hirsuta*. I have seen them growing together, but failed to find any connecting links, unless *A. ciliata* var. *hispida* can be regarded as such. *Cochlearia groenlandica* L. has been found up to 700 feet on Slievedonagh, and on the Great Blasket Island; one would hardly have expected it so far south. *Viola lactea* is placed under *V. canina* as a variety; but the hybrids between them are always sterile. *Ononis repens*, regarded by Mr. Scully as only doubtfully native, occurs usually as the spinous form—var. *horrida* Lange; but this is a sea-side plant, not very likely to be introduced. *Lathyrus maritimus* and *Diotis* are extinct. "The famous Fuchsia bush at Glanleam, Valencia, had in 1905 a circumference of 98 yards (*Miss Delap*): this represents the growth of one original bush, although its branches have now rooted all round, forming one dense mass." *Arbutus*, Holly, and other trees formerly suffered much, being used as charcoal for smelting. *Utricularia Bremii*, collected by Mr. Druce in the Gap of Dunloe, 1875—the first flowering specimens known from the British Isles—is vouched for by Professor Glück. *Scutellaria galericulata* × *minor* has been observed near Kenmare, and is frequent about the Killarney lakes. *Euphorbia hiberna* "is no doubt one of the survivors of the Lusitanian invasion which reached Ireland probably in pre-glacial times;" all the districts produce it in greater or less quantities. *Spiranthes Romanzoffiana* has a station only a few miles over the Cork boundary, and should be searched for in Kerry. *Elisma natans* is entered on the authority of Professor Glück; he has referred to this a submerged barren plant, gathered at Killarney by Mr. Druce, "which, to the unaided eye, is quite indistinguishable from submerged growths of *Alisma ranunculoides*." *Scirpus parvulus* is abundant at intervals for a distance of about three miles on both sides of the tidal River Cashen, near Ballybunion; Arklow (Co. Wicklow) is the only other known Irish habitat. "In the field *Carex punctata* may be readily distinguished from *C. distans* by its *spreading* fruit, which is a very constant character in the Kerry plant, the fruit of *C. distans* being always more or less ascending." *C. acutiformis* (*paludosa* Good.) has not been observed. *Agrostis canina* var. *lævis* Hackel, from near the summit of Brandon, "differs from the type in its larger spikelets and broader leaves, and in its panicle branches and pedicels being smooth instead of rough." Although *Poa alpina* was noted by Mackay on the summit of Brandon as being "not at all viviparous," it was exclusively so, in 1911, and maintains this condition in my garden. *Glyceria declinata*, here treated as a dwarf variety of *G. fluitans*, is much nearer to *G. plicata* in floral characters, but deserves specific rank. *Bromus commutatus* apparently possesses as good claims to be considered native, in some meadows near Killarney, as anywhere in southern England. *Trichomanes radicans* has a sad history of wanton destruction.

The writer of this by no means exhaustive notice is an old friend of the author, and can recall many pleasant memories of botanical rambles with him. Mr. Scully's book may be as strongly recommended to English as to Irish readers: it is accurate, scholarly, interesting, and suggestive throughout.

EDWARD S. MARSHALL.

Evolution by means of Hybridization. By J. P. LOTSY. 8vo, pp. x, 166, 2 text-figs. M. Nijhoff: The Hague. 1916. Price 6*s*. net.

WE are grateful to Dr. Lotsy for writing his book in English, more especially when we remember that he is equally competent to write it in almost any of the better-known European languages. Apart from our recollection of a former remark of Dr. Lotsy's that English, if it were not for the pronunciation, might be taken as the universal language, we remember that it was at a meeting of our Linnean Society a few years ago that Dr. Lotsy introduced the point of view which he has elaborated in the present volume—the view, namely, that the origin of species is due solely to crossing. Probably no one will agree entirely with Dr. Lotsy, but everyone will admit that he has given a remarkably clear and interesting statement of his position.

The author starts with a definition of terms. The "Linnean species," which he defines as the total of individuals which resemble one another more than they do any other individuals, he terms a Linneon. The so-called microspecies, Jordanian species or elementary species which can be distinguished within many Linneons and which remain constant when reproduced by seed, he terms Jordanons. But even the test of faithful reproduction by seed is no proof of specific purity. There are, for instance, two kinds of white mice externally indistinguishable and reproducing their kind faithfully and yet of different constitution, as is shown by mating a female of each kind with the same black male. In one case the offspring will be uniformly black, in the other uniformly grey. Hybrid analysis is necessary to detect these constitutional differences, and hence we can define a species as "the total of individuals of identical constitution unable to form more than one kind of gamete." Unfortunately there is no absolute test for a "species," and further, such species are very rare in Nature. The botanist who has been in the habit of regarding the old style species as a unit for purpose of his work will, however, be comforted to hear that while neither the Linneon nor the Jordanon represents the ultimate organic atom, yet that these groups of individuals are natural. "It is Nature itself," says Dr. Lotsy, "which groups the individuals to Linneons, and Linneons are thus something more than mere conceptions of the human mind." A Linneon is a group of individuals of different constitutions, which is merely a vestige of a very large number of types which spring from a cross. Intercrossing has taken place within the Linneon, and by selection has resulted in a certain uniformity of appearance which then characterizes the Linneon. Linneons, though themselves the result of a cross, are kept distinct in nature by obstacles against their freely crossing with other Linneons. Hence, at any rate, the members of any one Linneon have a common origin. Further, the degree of variability which the botanist recognizes within the limit of the species (O.S.) is explained from Dr. Lotsy's point of view by the constant occurrence within the Linneons of new forms resulting from intercrossing. The species (N.S.) or ultimate unit remains, like the constitution of the gamete, very much *in nubibus*, where, we fear, the systematist, at any rate, will be constrained to leave it.

Dr. Lotsy is severe on mutations. In his chapter "Do diploid species vary?" he claims that, while it is not inconceivable, there is no evidence that a homozygous individual can become heterozygous without having been crossed. and this is what is implied in mutation. We cannot be sure of the homozygous condition, that is of the specific purity, of the material from which the supposed mutants arise; *Œnothera Lamarckiana*, for instance, has never been obtained in a homozygous condition.

New species arise from a polygametic hybrid obtained by mating gametes of different constitution, which are brought together by crossing different species. The polygametic hybrid thus obtained gives rise to new forms, some of which are heterozygotes, while others are homozygotes, that is new species. By isolation of such homozygotes in the experiment garden and by selfing them or by mating them with other individuals of identical constitution, but of different sex, we can multiply them and thus obtain new species consisting of as many individuals as we choose to raise. It is not necessary that the gametes which unite to give rise to the polygametic hybrid should be derived from pure species; they may equally well be derived from hybrids, as it is the constitution, not the origin, of these gametes which is of consequence. Hence new species may originate polyphyletically.

Further, as the spot where the mating of such gametes takes place is as indifferent to the effect as is the origin of the gametes, the same species may be born at different spots, that is to say, species may arise polytopically.

This theory is disastrous to phylogeny. Since the source of the uniting gametes is a matter of indifference, similar individuals may arise from widely different sources, and similarity is therefore no guide to relationship. Hence phylogeny, or reconstruction of what has happened in the past. is merely a product of fantastic speculations.

Dr. Lotsy extends his theory to include the origin of the great groups of plants. A new class is merely the result of a happy meeting between two sufficiently differently constituted gametes.

In order to study the constitution of the gamete the author suggests the advantage of dealing with haploid organisms, the result of a single gamete, such as a moss-plant, rather than diploid organisms, like the higher plants, which are the result of the interaction of two gametes. Moreover, if it could be proved that a moss-plant were able to produce more than one kind of gamete, mutation would have been proved in so far at least as we should be justified in concluding from such a result that a monogametic organism can become polygametic without the direct interference of a cross.

A. B. R.

A Textbook of Botany for Colleges. By WILLIAM F. GANONG, Ph.D., Professor of Botany in Smith College. New York: The Macmillan Company. 8vo, pp. xii, 401. Price 8*s.* 6*d.* net.

PROFESSOR GANONG earned the gratitude of teachers by his previous work, *The Teaching Botanist.* His present book appeals to a different class of readers, for whom there is, perhaps, more provision in existing manuals. It is meant not for those beginning a botanical career but for the general student; and for this purpose it seems to us admirably adapted. It deals with general anatomy—or, as it is commonly miscalled nowadays, morphology—and physiology, systematic botany being reserved for a second volume, and is mainly confined to flowering-plants. As might be expected from its authorship, the physiological aspect is fully emphasized and elucidated, while such comparatively new topics as chemosynthesis, enzymes, the rise of water by traction, chimæras, Mendelism, mutations, and double fertilization are succinctly but clearly dealt with. If American authors wish for the circulation of their books in this country, they should add the scientific names of the examples cited: such names as "Bunch-grass" or "Spanish bayonet" will convey little meaning to English readers.

The book is fully illustrated with figures of physiological apparatus and with many old acquaintances from various sources, for the use of which the author makes a spirited apology on the same grounds as did Sir Roger de Coverley for his chaplain's borrowed sermons, that they were better than his own would be. The original diagrams here certainly bear out this view. It is hard that the popular French author, Louis Figuier, whose work is drawn upon, should be consistently misrepresented throughout as "Figurier."

G. S. B.

BOOK-NOTES, NEWS, ETC.

THE Kew *Bulletin* published in December (1916, no 10; the volumes are not numbered) contains an account, with bibliography, of the late HENRY HAROLD WELCH PEARSON, whose death took place at Mount Royal Hospital, Wynberg, Cape Town, on November 3. Born at Long Sutton, Lincolnshire, on Jan. 28, 1870, he went to Cambridge in 1893, where he graduated B.A. three years later; in 1897 he visited Ceylon as a Travelling Scholar of the University, and on his return was appointed Assistant Curator of the University Herbarium. In 1899 Pearson became Assistant for India in the Kew Herbarium, and at the end of 1890 joined the Kew staff. In 1903 he was appointed to the chair of Botany (since known as the Harry Bolus Professorship) in the South African University, which he held to his death; we understand that he will be succeeded by Dr. C. E. Moss. During his residence in South Africa Pearson undertook various journeys into the interior, which were productive of interesting results; in the course of these he visited the "Welwitschia Desert," and many of his most important investigations were connected with the remarkable plant indicated. The military occupation of South Africa by the Union Forces has afforded an opportunity for the preservation of *Welwitschia*, which has been ordered by official proclamation of the Administrator of the Protectorate of South-West Africa, reproduced in the number of the *Bulletin* already referred to.

In the same number is recorded the death of Mr. E. G. KENSIT, a member of the staff of the Bolus Herbarium since 1912, who was killed in action on 17th July last, at Delville Wood.

THE *Naturalist* for January contains a notice of CHARLES CROSSLAND, who died at his residence at Halifax in his seventy-second year on the 9th of December last. Actively engaged as he was in business, Crossland found time for an infinity of work, bibliographical as well as botanical; his proficiency in the latter is the more remarkable in that it was not until he was in his fortieth year that he took up the study of plants. Although possessed of a fair knowledge of British plants in general, it was to cryptogams, and specially to fungi, that his attention was principally devoted. Besides numerous papers on fungi in the *Naturalist* and in other local publications, Crossland was associated with Mr. W. B. Crump in *The Flora of the Parish of Halifax* (1904), for which he undertook the cryptogams, and with Mr. Massee in *The Fungus Flora of Yorkshire* (1905). The difficulty of preserving fungi led Crossland to represent them by drawings; in this art he attained great perfection, and his collection was acquired for Kew. His interest in local history is shown, among other ways, in the interesting account of his fellow townsman James Balbon (t. 1799), which—under the title *An Eighteenth Century Botanist* (1910)—he reprinted from a local newspaper. A full account of Crossland and his work (with portrait and bibliography up to date) is published in the *Naturalist* for October 1910, from which most of the above information is taken.

Miss Jekyll has added to the many volumes already standing under her name one on *Annuals and Biennials* ('Country Life' Offices, price 7*s*. 6*d*. net). "The purpose of this book," she tells us in her preface, "is to give practical advice as to the choice of kinds, to point out which are the best, to give simple cultural directions, and to offer a few suggestions relating to the use of annuals and biennials in various departments of garden practice"; and this purpose has been fulfilled with the thoroughness born of practical knowledge which characterizes all Miss Jekyll's books. As is also usual in these, there are a large number of excellent illustrations, both of garden borders and individual plants; among the former are some which will be familiar to those who have had the privilege of visiting her garden, of the latter, three are in colour, the frontispiece being the beautiful form of *Nigella* which was first raised by Miss Jekyll and bears her name.

The *Journal of Genetics* for December contains a paper by Mr. Bateson on "Root-cuttings, Chimæras, and Sports." Dr. B. D. Jackson defines a chimæra as "the product from a bud with mechanical coalescence of two parent forms"; periclinal chimæras are what we have been accustomed to call graft-hybrids. Mr. Bateson has experimented on certain cultivated forms of *Bouvardia*, of which an excellent coloured plate is given. Mr. W. A. Backhouse in "The Inheritance of Crossability" gives the results of his experiments in crossing forms of wheat with rye.

At the meeting of the Linnean Society on 14th December, 1916, Mr. H. S. Holden communicated and explained a paper by Miss Isabel McClatchie, B.Sc., entitled "Observations on the Root-System of *Impatiens Roylei* Walp." The primary root-system of this plant consists of a somewhat short tap root, a whorl of four robust lateral roots, and a number of accessory laterals. These soon become obsolete and are replaced by a large superficial root-system of adventitious origin derived from the lower half of the hypocotyl. In plants in which the first and subsequent nodes trail along the ground, additional roots are produced from these. Abortive roots commonly arise at the bases of lateral branches, and further development can be induced also in these by suitable manipulation. Various other factors such as wounding, increasing the height of the soil, etc., also induce accessory root-formation. The primary root-system is characterized by a 4-arch or 5-arch solid xylem star, and by the early development of tyloses. The stout adventitious roots are polyarch with a wide pith, and develop a superficial protective cork layer. They show, in common with the other parts of the plant, the tannin sacs and raphides characteristic of the genus.

At the same meeting a paper "On the Distribution of Monœcious Plants, and the Occurrence of Hermaphrodite Flowers in *Myrica Gale*, with Observations on Variations of Sex," by Miss A. J. Davey, M.Sc., and Miss M. Gibson, B.Sc., was explained by the authors. *Myrica Gale* is described as being typically diœcious, but mention has been made by several authors of the occasional occurrence of the monœcious condition. Observations during several successive years on a large area of *Myrica* in the peat moors of Somerset show that there is always a small proportion of monœcious plants, which present all gradations between the normal pistillate and staminate types. Further, it has been found that the sex of a plant may vary from year to year. The monœcious plants may be grouped as follows:—(*a*) Plants bearing both staminate and pistillate catkins of the normal type. These occur on different shoots, or they may be mixed on the same shoot. In the latter case, usually the lower part of the shoot is staminate and the upper part pistillate, but the reverse order may obtain. Staminate, pistillate, and mixed shoots may occur on the same plant, and the proportions of each vary considerably. (*b*) Plants bearing androgynous catkins. Such catkins usually contain stamens below and pistils above, but the reverse arrangement is found also. (*c*) Plants whose catkins consist of hermaphrodite flowers. These flowers (like the unisexual flowers) occur singly in the axis of the catkin scales. Each flower consists of a central ovary, surrounded by 3 or 4 stamens (less commonly 2). Just below the insertion of these on the short floral axis, there are two small outgrowths corresponding to the "bracteoles" of normal pistillate flowers. The pistillate flower consists of an ovary flanked by two "bracteoles" adnate to it, which enlarge and persist in the fruiting stage; the staminate flower consists of a group of stamens (commonly four), without bracteoles. The hermaphrodite flowers are proterogynous. They produce normal fruits, and their stamens are functional. Among plants or shoots marked and examined in successive years, some showed progressive change from pistillate to staminate during several seasons; *e. g.* plants producing abundant fruit in 1913 showed mixed shoots in 1914, and in 1915 became almost entirely staminate. In 1916 several such cases showed indications of the reverse change. Some plants appear to be continually fluctuating, while others remain stable for many seasons.

THE recently issued part (vol. vi. part 3) of the *Transactions and Proceedings of the Perthshire Society of Natural Science* contains a second portion of the "Notes on Roses" by the President, Mr. W. Barclay, which it may be regretted does not appear in some publication more readily accessible. It is largely concerned with *Rosa spinosissima* (spelt throughout "*spinossissima*") and its hybrids; Mr. Barclay retains this name for the plant, considering that Crépin's view that Linnæus intended by it *R. cinnamomea* (spelt "*cinnamonea*") is untenable. Mr. Arthur Bennett has notes on *Potamogeton crispus* × *alpinus*, a hybrid new to Britain which has been found in Perthshire, and *P. gracilis* Wolfg., from the same county; Ascherson and Graebner's monograph of the genus in *Das Pflanzenreich* (1907) is somewhat severely and doubtless deservedly criticized, though the criticisms might with advantage have been more clearly expressed.

WE regret to record the deaths of DANIEL OLIVER, which occurred at Kew on December 21st, and of CLEMENT REID, who died at Milford-on-Sea on December 10th; notices of each will appear in an early issue.

NOTES ON MESEMBRYANTHEMUM FROM THE NATIONAL HERBARIUM.

By James Britten, F.L.S.

The following notes relate almost exclusively to the species of *Mesembryanthemum* described—many of them for the first time—in Aiton's *Hortus Kewensis* (1789). In the second edition (1811) Haworth's arrangement (*Miscellanea Naturalia*, pp. 15–106, 1803) is followed. Of this and of Haworth himself more will be said later: in the course of these notes I have had occasion to refer to his publications on the genus—*Observations on Mesembryanthemum* (1794); *Miscellanea Naturalia* (1803); *Synopsis Plantarum Succulentarum* (1812); *Supplementum* (1819). I have also referred to Sonder's monograph of the South African species in *Flora Capensis*, ii. 387–460 (1862), and to the *Mesembrianthemen und Portulacaceen* (1908) of Mr. Alwin Berger, late curator of the famous garden at La Mortola, under whose care a large number of species was there in cultivation.

I. Ann Lee's Drawings.

From time to time attention has been called in these pages to the collection of unpublished drawings in the Department of Botany. Apart from their interest as specimens of plant-drawing, they have a scientific value, as they are in many cases named by Dryander and referred to in the Solander MSS. on which Aiton's *Hortus Kewensis* was largely based, thus becoming more or less typical for that work, especially in cases where the actual specimens described have not been preserved.

Among these one of the most interesting is a folio volume catalogued as "Coloured Drawings of Mesembryanthema by Miss Lee." This contains 19 drawings, of which 16, on vellum, are signed "A. Lee, 1776"—one is 1778. Of the remaining three (on paper) one (no. 13) is signed "S. Taylor, 1777," who is evidently also responsible for no. 10 and probably for no. 6—we have in the Department a large number of drawings by Simon Taylor, of whom some account will be found in the *Dictionary of National Biography* (lv. 464). All are named, mostly by Dryander, and are interesting and in some instances important in relation to Aiton's *Hortus Kewensis*, as, in the absence of specimens, they are the only authentic material for the species.

Ann Lee was the daughter of James Lee (1715–95) the celebrated nurseryman of Hammersmith, whose garden was the resort of the botanists of his time, and who introduced numerous plants to cultivation, including *Fuchsia coccinea*. Among the genera to which he paid special attention was *Mesembryanthemum*, which was fashionable in the latter part of the eighteenth century, and which he was "reported to know much better than any one." Haworth, who tells us this (Obs. Mesembryanth. p. 22), disparages this estimate, but it must be remembered that, according to his own account, he was treated rudely by Lee on the occasion of his visits to the nursery, which he left "saturated with disappointment and affront," resolved "to record the behaviour which occasioned my perplexity"—this he does at some length (*op. cit.* 25–28)—and "to return to the scene of it no more." Whatever Lee's scientific knowledge of the plants may have been, it is certain that he had a large living collection of them, and it was from this that his daughter made the drawings which form the subject of this note. Haworth himself, however, was recognized by Dryander as the principal authority on the genus; this is evident from the fact that in the second edition of the *Hortus Kewensis* the arrangement of the genus in his *Miscellanea Naturalia* (1803) is exclusively followed, and the diagnoses of the species are in every case taken from it, with reference: even the species originally described in Hort. Kew. ed. 1 are here cited from "Haworth Misc. Nat.," the original place of publication being ignored.

Of the artist herself little is known, but her work was evidently (and deservedly) in repute in the middle of the eighteenth century, to which period most of the scanty references to her relate. The drawings of *Mesembryanthemum* range in date from 1776 to 1778; Stokes (*Commentaries*, p. cxxviii) says that Fothergill (1712–80) engaged her to make coloured drawings of the rarer plants in his garden at Upton (Essex); and Davall (1763–98), writing to Smith in January 1790, speaks of "Miss Lee's drawing of *Protea mellifera*" as being in her father's possession, thus suggesting that she herself was dead at that time. Some thirty years ago (see Journ. Bot. 1884, 123), Mr. James (misprinted John) Lee, grandson of James and thus nephew of Ann, was good enough to show me some excellent flower-drawings, dated 1771–76, which were the work of his aunt, and her numerous drawings of birds and insects are also in possession of the family. She also collected insects: of these Thunberg, when visiting James Lee while in England in 1778, saw her "fine collection" which had just been increased by "the uncommonly beautiful insects from the coast of Bengal which Lady Monson had collected there and bequeathed to Miss Lee" (*Travels*, iv. 291).

1. M. CADUCUM Ait. Hort. Kew. ii. 179.

The drawing of this is from a specimen past flowering and is of little value. The name on the drawing is in Solander's hand, but the diagnosis as printed in Hort. Kew., which is followed by a full description, in that of Dryander. In Ind. Kew. the species is entered as "[Soland. in] Ait. Hort. Kew.": the reasons, sufficiently conclusive, against this method of citation are set forth in my *History of Aiton's 'Hortus Kewensis'* (p. 4) issued as Supplement III. to this Journal for 1912. It appears from the book kept in the Banksian Herbarium (now in Bot. Dept.) in which were entered the plants brought to be named from Kew (1777–97) and other gardens that this was brought in May 1778: Dryander notes "preserved in spirits to be examined with the rest." A few Banksian specimens in spirits, without (or with illegible) labels are in the Department; they are probably identical with some of the species of Hort. Kew. and should be examined by monographers. In common with most of the Hort. Kew. species, this was introduced by Masson in 1774: an interesting note as to the extent of the genus is in

Haworth's *Synopsis* (p. 236): "When the great botanic traveller Masson (who traversed the Cape countries for twenty years) was asked whether he had sent all the Mesembryanths to England, his emphatic answer was 'No! nor half of them.'"

2. M. HUMIFUSUM Ait. Hort. Kew. ii. 179.
This drawing appears to be the only authentic material in existence for the species, which recent authors have failed to identify. Sonder (Fl. Cap. ii. 457) merely reproduces the Hort. Kew. description and cites no specimens; Berger (*Mesembrianthemen*, 53) places it after the described species at the end of his Expansa group and says "ungenügend bekannte Art." This being so, it may perhaps be worth while to transcribe from the Solander MSS. Dryander's detailed account, which follows the diagnosis printed in Hort. Kew.:—

"*Tota planta* procumbens, undique scabra, papulis elevatis, copiosissimis, conicis, obtusis.

"*Folia* opposita, spathulata, obtusa, duas vel tres uncias longa, supra plana, subtus carinata.

"*Flores* pedunculati.

"*Calyx* quinquefidus: *laciniæ* lanceolatæ, inæquales.

"*Petala* minutissima, albida.

"*Styli* quinque.

"*Capsula* quinque coronata quinque corniculis compressis, apice bifidis."

On the drawing the name is referred to "Linn. Supplem.," but it is not to be found therein.

Haworth (Obs. 420) says he had not seen the plant: a reference to this page will show that the "*humifusum* Lee" of Ind. Kew. has no actual existence.

In the Banksian Herbarium Dryander attaches the name *humifusum* to a specimen from Jacquin's herbarium, without other information, which provides little material for identification or examination. Elsewhere (Syn. 248) Haworth says the species "according to the *Hortus Kewensis* is shrubby; otherwise I should have thought it might not be distinct from the strictly annual *M. lanceolatum*": but no such character as that alleged is in the Hort. Kew. description.

3. M. APETALUM L. f. Suppl. 258 (1781); Ait. Hort. Kew. ii. 180 (diagnosis from Dryander's MS., where is also a full description).

M. CALAMIFORME L. Sp. Pl. 690; Ait. Hort. Kew. ii. 181.
The drawing is lettered "M. calamiforme L. var.": there is no reference to the species in Solander MSS.

5. M. PALLENS Ait. Hort. Kew. 182.
Dryander has in MS. a full description as well as the diagnosis, but the species is generally recognized and it does not seem necessary to transcribe this. *M. pallens* Salm-Dyck, § 63, f. 2, looks to me different, but Berger accepts the identity and reproduces Salm-Dyck's figure as representing Aiton's plant.

6. M. LIMPIDUM Ait. Hort. Kew. ii. 183.
This species is omitted from the index to Fl. Cap., but is in the text

(p. 453) placed as a synonym under *M. criniflorum*—a name which Sonder cites as of "Houtt. Pfl. Syst. 2 D. t. 53," [1778] in which he is followed by Berger (p. 40). A reference to this plate shows that it bears no name, and in the text the plant stands as *M. pugioniforme*. The name *criniflorum* dates from Linn. f. Suppl. 259: whether Houttuyn's description and curious plate are identical with this I am unable to judge. Haworth (Revis. 162) fully describes the plant from specimens sent him by Aiton, and Dryander gives a detailed description; but it does not seem necessary to reproduce this, as the identity of the species is not doubtful: the drawing is probably by Taylor.

7. M. HISPIDUM L. Sp. Pl. 482; Ait. Hort. Kew. ii. 184.

The drawing is named by Solander "Mesembryanthemum hispidum var. floribus majoribus." The entry of the species in the MSS. (there is no description) is in his hand, with a note of a variety which is not that figured.

Of this species we have a specimen from Cliffort's garden which represents "M. caule hispido" of Hort. Cliff. on which *M. hispidum* was based. The label attached to the sheet has Boerhaave's name, as cited in Hort. Cliff., but was wrongly identified by the unknown person who added Linnean binomials to the sheets. Dryander, however, correctly identifies it as *M. hispidum*, of which we have also a specimen from Gronovius, doubtless given him by Linnæus.

8. M. AUREUM L. Syst. Nat. ed. 10, 1060; Ait. Hort. Kew. ii. 190.

There is nothing in Solander MSS. relating to this.

9, 10. M. GROSSUM Ait. Hort. Kew. ii. 191.

There is nothing in Solander MSS. relating to this, and, in the absence of specimens, the only authentic material of importance is Taylor's drawing, that of Ann Lee being only a fragment, the end of a branch. The diagnosis in Hort. Kew. is very short—"M. foliis subcylindricis confertis papulosis, caudice basi incrassatis, ramis diffusis glabris": Haworth—who in 1794 (Obs. 255) said he had seen it, but had no proper specimen for description—in 1803 (Misc. 56) gives a new diagnosis (not incompatible with that in Hort. Kew.) and adds a description of the flowers—"Corolla mediocris petalis multiserialibus primo pallide-carneis, demum stramineo-carneis"—and a note on its cultivation. Taylor's drawing shows a large plant with several branches bearing pale yellow flowers about two-thirds of an inch across, of which dissections are given. Sonder (Fl. Cap. ii. 449) cites the species from Haworth (Syn. 252) and a figure from Salm-Dyck (§ 54, f. 3) which hardly agrees with Taylor's drawing, to which the attention of future monographers may be directed.

11. M. BRACHIATUM Ait. Hort. Kew. ii. 191.

This is not included in Solander MSS. Sonder (Fl. Cap. ii. 448) suggests its identity with *M. decussatum* Thunb., but the flowers of that are described as white, whereas those in the drawing are yellow. Berger makes no reference to it.

12. M. MOLLE Ait. Hort. Kew. ii. 192.
In Solander MSS. the species is not described, but two forms are noted: "α. floribus flavis" (which the drawing represents): "β. petalis intus intense aurantiacis, cætus læte rubris." Of the latter a specimen was received from Kew Aug. 17, 1778: Dryander notes in the garden book (see under 1) "what you [? Aiton] called *molle* is certainly a different species." Haworth (Obs. 262) amplifies the diagnosis in Hort. Kew. and adds a full description of the growing plant, as to which he had earlier (*op. cit.* 139) expressed some doubt: later (Syn. 262) he gives a full description of the flowers, which he had not previously seen.

13. M. SESSILIFLORUM Ait. Hort. Kew. ii. 193.
There is no reference to this in Solander MSS. and Berger (p. 37) says it is quite unknown. The description in Fl. Cap. (ii. 454) is taken from Haworth (Syn. 247), which in its turn is derived from Hort. Kew.: it would appear therefore that Taylor's drawing is the only authentic material for the species.

The brief diagnosis in Hort. Kew. runs: "M. foliis planis spathulatis caulibusque papulosis, ramis divaricatis, floribus sessilibus." Taylor figures a plant with several branches; the yellow flowers (of which dissections are given) are somewhat smaller than those of *M. grossum.*

The plant which Haworth first described (Suppl. p. 93, 1819) as "an varietas *M. sessiliflori*?" and later (Revis. 158, 1821) as "β. album"—the species being "α. luteum"—is referred by Berger (p. 34) to *M. clandestinum* Haw.

14. M. HELIANTHOIDES Ait. Hort. Kew. ii. 193.
There is no description in Solander MSS.; the plant is generally recognized.

15. M. POMERIDIANUM L. Sp. Pl. 698; Ait. Hort. Kew. ii. 194.
There is no reference to this in Solander MSS.

16. M. ECHINATUM Ait. Hort. Kew. ii. 194.
Dryander's diagnosis is not amplified in the MSS., which include the two forms—"α. flore luteo" and "β. flore albo" of Hort. Kew.: the drawing represents the former. Haworth (Syn.) gives a diagnosis of each. In the MSS. Dryander gives Masson's definite locality—"in campis aridis prope Swartkop's rivier"—where the plant was subsequently collected by Zeyher.

17. M. CORDIFOLIUM Linn. f. Suppl. 260; Ait. Hort. Kew. ii. 182.
This on the drawing is named *sylvaticum*, under which name it was originally described by Dryander in the MSS., where *cordifolium* was later substituted by him for it. Masson's locality is entered by Dryander as "sylvis prope Krum rivier et Zee Koe rivier": in the latter locality it was also collected by Thunberg, probably at the same time.

18, 19. M. AITONIS Jacq. Hort. Vindob. iii. 8, t. 7 (1776).
This was described by Jacquin from plants raised from seed sent "ab egregio et expertissimo Gulielmo Aiton," after whom he named

it. There is no description in the Solander MSS.; the two drawings are noted by Dryander as representing the plant in its first year—this corresponds closely with Jacquin's figure—and in its second. In Hort. Kew. ii. 182. it is placed under *M. papulosum* L., but Haworth (Syn. 247, Misc. 48) pointed out its distinctness and in this has been followed by subsequent authors. Specimens from Jacquin's herbarium are in Herb. Banks.

II. Masson's Drawings and Specimens.

The four interesting drawings of *Mesembryanthema* by Masson, to whom the introduction of very numerous species was due, formed the subject of comment in a paper on his drawings in general in this Journal for 1881 (p. 146). That, however, was a long while ago, and it seems worth while to repeat the main facts here. with such information as has since accrued, in order that the information relating to our drawings of the genus may be accessible in one place.

M. pinnatifidum L. f. Suppl. 260; Ait. Hort. Kew. ii. 193. This generally recognized species calls for no special remark. The Banksian specimens are from Thunberg (on whose specimens Linn. f. based his description) and Masson, from whose material the plant is fully described in Solander MSS., in the handwriting of Sigismund Bacstrom, one of Banks's assistants (see Journ. Bot. 1911, 92): so many of the descriptions of Masson's plants are in Bacstrom's hand as to suggest that he may have transcribed them from a MS. of Masson or possibly from that of Thunberg (see under M. *digitatum*). The locality of Masson's specimen is given in the MS. as: "In montibus Roode Zand prope Water Val in Paardeberg."

M. ciliatum Ait. Hort. Kew. ii. 179. Of this remarkable species the only authentic material, apart from that in Thunberg's herbarium, which Sonder consulted, is in the Department of Botany, where are three specimens from Masson and a drawing of a large plant; of this latter a fragment is reproduced by Berger (p. 61), who says that the species is not in cultivation. Both Berger and Sonder (Fl. Cap. ii. 436) cite the species as of Thunberg in Nov. Act. Nat. Cur. viii. App. ii.; but, as has already been shown, that publication dates two years later than Hort. Kew. The same plant is doubtless intended in both cases, although Ind. Kew. enters them as distinct. There is a full description (in Bacstrom's hand) in Solander MSS., where the plant is localized: "In locis depressis infra bockland berg et in Handtom ad Prom. b. Spei"; although worded differently, this is probably identical with that given by Thunberg, as Masson and he were associated in some of their journeys. It was met with in the Karroo region by the Percy Sladen Memorial Expedition, 1908–9.

M. corallinum Thunb. in Nov. Act. Nat. Cur. viii. App. 12. This, although fully described in Solander MSS., is not included in Hort. Kew. As to the preceding, the only authentic material is that of Thunberg and Masson: the Banksian specimens, although attributed to the latter, are localized "Locis aridissimis Olyvants Rivier" in Thunberg's hand. Neither Sonder nor Berger cites any later collector; and the latter says the plant is not now in cultivation.

M. DIGITATUM Ait. Hort. Kew. ii. 181.
It would appear that of this very distinct species the only authentic material is that afforded by Masson's drawing: Sonder says it is not in Thunberg's herbarium, nor is it in Herb. Banks.; Berger (p. 228) reproduces a fragment of Masson's large drawing. The species was met with in Little Namaqualand during the Percy Sladen Memorial Expedition to the Orange River in 1910–11, and groups of the plant are reproduced from photographs then taken in the *Gardeners' Chronicle* for August 19, 1911 (p. 124) in the course of some notes on the expedition contributed by the late H. H. W. Pearson. Pearson says: "The erect stems are very short, and bear one to three leaves, of which the uppermost and youngest resembles a very corpulent finger. They contain much water and are very soft, so that a dried specimen can give but little idea of the natural appearance of the plant," which seems admirably conveyed in Masson's drawing. The distribution is very local: it was "only found in a few small patches in this stretch of desert, where, apparently, Thunberg's specimens also were observed."

As in other cases, Thunberg's later name (*op. cit.* p. 6) is employed by Sonder and other authors: Berger, however, whose attention was directed to Masson's plants (though this is not stated) by my paper in this Journal for 1884, rightly adopts that of Hort. Kew. In *Index Kewensis*, Thunberg's name is retained and that of Hort. Kew. is reduced to a synonym: had the dates been appended to each reference —a never sufficiently to be regretted omission—the order of precedence would, as in so many other cases, at once have been clear. The note as to the MSS. in Journ. Bot. 1884, 146, is not altogether correct: the detailed description (transcribed by Bacstrom) is stated by Dryander to be from Thunberg, but Thunberg's name was not added to Solander's diagnosis until later (by Dryander) and there is no ground for my former suggestion that Solander "purposely modified" Thunberg's name—of which, indeed, he could hardly have been aware.

There are in the Banksian collection a large number of specimens from Masson which have never been worked up but are worth the attention of a monographer: one is fully described and named in Solander MSS., where is also described another whose name I have not found on any sheet. Many of the specimens are, as *Mesembryanthema* go, quite good; they could probably be identified by one acquainted with the genus and may possibly represent some of the species—described in Hort. Kew. from Masson's material—of which no types are known to exist. Of the 69 species in Hort. Kew., 19 are described only from Masson's material, and 5 others were introduced by him to cultivation.

There are also in the Herbarium a few specimens from Oldenburg which present less satisfactory material, and one collected at False Bay by James Robertson in 1772.

M. EMARCIDUM Thunb. in Nov. Act. Nat. Cur. viii. App. 9 (1791) is superseded both by Sonder and Berger, and in Ind. Kew. by the later *M. anatomicum* Haw. Misc. 50 (1803). We have specimens from Masson.

III. The Sloane Herbarium.

The numerous references in Hort. Kew. to the volumes containing the Hortus Siccus of Mary Duchess of Beaufort (1630?–1714) relate to species previously described by Linnæus, but may be regarded as typical for Aiton's work. The following is a list of these:—

	H. S.	fol.		H. S.	fol.
acinaciforme......	133	19	*noctiflorum*	142	72
albidum	131	23	*pugioniforme* ...	142	75[74]
barbatum	133	17	*spinosum*	142	67
deltoides	131	40	*tuberosum*.........	142	67
dolabriforme......	142	72[73]	*uncinatum*	142	64
linguiforme	131	22			

In the second edition of Hort. Kew. the Duchess's specimens of *M. deltoides*, *M. linguiforme*, and *M. uncinatum* are referred respectively to *M. muricatum*, *M. scalpratum*, and *M. perfoliatum*, all of Haworth. In this edition two other species, *M. floribundum* and *M. hispidum*, are mentioned as having been cultivated by her, but without reference to Herb. Sloane: in this, however, there are many specimens not referred to in Hort. Kew. ed. 1, and these may be among them. Her specimens are all well dried and should be of interest to monographers: many are figured in the two volumes of drawings made under her superintendence at Badminton. The Sloane Herbarium also contains other cultivated specimens.

IV. Other Species described in Hort. Kew.

The following notes on other species first characterized in Hort. Kew. may be worth consideration: the ignoring of the names may perhaps be accounted for by the fact already mentioned that in Hort. Kew. ed 2 all the names are cited as from Haworth, but he himself in his *Observations*, to which in the *Miscellanea* he always refers, was careful to quote the original place of publication.

M. deflexum Ait. Hort. Kew. ii. 187 (1798) is cited by Sonder and Berger as of Haworth, and is placed by them under the much later *M. elegans* Jacq. Hort. Schoenbr. iv. 18 (1804).

M. compactum Ait. Hort. Kew. ii. 191.
This seems to be an altogether doubtful plant: Solander in the MSS. only adds to the printed diagnosis "flores flavi; folia longitudine et crassitie digiti: floruit in Horto Kewensi Nov. 1781." Haworth (Obs. 156) says he was unable to see it at Kew, though he went there twice for the purpose. Sonder (Fl. Cap. ii. 396) places it doubtfully under *M. nobile* Haw.—a plant with leaves six lines wide, to which therefore it cannot belong,—and Berger makes no reference to it.

According to Hort. Kew., its introduction was due to "Mr. William Paterson." This may have been the Colonel of that name who was in South Africa 1777–81 and published in 1789 a *Narrative of Four Journeyings*, which contains numerous references to the plants which he observed. He is thus referred to by Thunberg: "Paterson, William, Anglus, circa 1773 per aliquod tempus, sub sua commoratione, longinquiora suscepit itinera, variaque nova et valde curiosa in patriam suam transmisit" (Fl. Cap. x.). It seems more probable, however, that the Hort. Kew. reference is to another man of the same name whom Thunberg met at the Cape in 1778, and of whom he gives the following account: "I met here with a Mr. Patterson, an Englishman, who was come to this place, in order to collect from the interior of Africa and transmit home to his own country both the seeds and live roots of such plants as were scarce and peculiar to these parts. He professed to travel at the expense of certain individuals, and professed some small knowledge of Botany, but was in fact a mere gardener" (*Travels*, iv. 271).

M. VIRIDIFLORUM Ait. Hort. Kew. ii. 196.
Dryander in the MSS. adds descriptive notes to the diagnosis, but the plant is generally recognized, so there seems no need to transcribe them.

M. LÆVE Ait. Hort. Kew. ii. 232.
This species, duly entered (though wrongly ascribed to Solander) in *Index Kewensis* and recognized by Haworth, seems to be ignored by later authors—*e. g.* Sonder (Fl. Cap. ii. 408) and Berger (p. 136)—who take up *M. læve* Thunberg. The diagnoses of the two plants, brief as they are, show that they could hardly be identical: that of Hort. Kew. runs—"M. foliis cylindraceis obtusis amplexi caulibus lævibus, calycibus quinquefidis: laciniis oblongis obtusis. Upright white-wooded Fig Marygold": that of Thunberg (Prodr. 1800, p. 90) "M. foliis trigonis lævibus, caule de cumbente articulato." This latter is of course antedated by the detailed description in Nov. Act. Acad. Cur. viii. App. 16 (1791), and as we have Dryander's unpublished description, the two may be placed side by side by way of contrast:

Thunberg.	*Dryander.*
	Planta erecta, glauca, lævis.
Caulis filiformis, decumbens, articulatus, cinereus, glaber, ramosus, crassitie dimidia pennæ, pedalis.	*Caulis* semiteres.
Rami erecti, breves, foliosi.	
Folia decussata, connata approximata, subteretia, supra planiuscula, obtusa, impunctata, glabra, erecta, pollicaria.	*Folia* amplexicaulia, læviter connata, subcylindracea, obtusa, lævia, vix uncialia.
Flores in ramulis terminales, solitarii, flavi.	*Pedunculi* axillares, foliis paulo longiores.
Perianthium 4-fidum: laciniæ duæ oppositæ breviores.	*Calyx* quinquefidis: laciniæ oblongæ, obtusæ, subæquales.
	Corolla rubra, calyce duplo longior.

It will be obvious from these descriptions that the two plants cannot be identical: this was pointed out by Haworth (Miscell. 86), who says: "I have not seen this plant, but have taken it from Thunberg's

Prodromus and changed its name; because that of *læve* has long been preoccupied by a tall erect woody species with rubicund flowers, in the Hort. Kew. and inserted in this arrangement [p. 64] in the section *Rubicundæ Teretiuscula*." Whatever may ultimately be decided as to *M. læve*, it is clear that Sonder and Berger have no ground for ignoring the Hort. Kew. name, which is entirely omitted by both authors, and that, unless this be ultimately reduced to some earlier species, *M. læve* Thunberg must be replaced by Haworth's *Thunbergii*.

M. AUSTRALE Solander ex Forst. Prodr. 90 (1786), *nomen*; Ait. Hort. Kew. ii. 187.

This is described at length in the Solander MSS. from specimens collected by Banks and Solander in New Zealand in 1769; a drawing (partly coloured) by Sidney Parkinson is among those made during the voyage. A careful collation of the MSS. relating to the collections made during the voyage leads to the conclusion that no dried specimens were preserved: we have, however, a specimen in spirit, the label of which is quite illegible, which almost certainly represents the plant then collected.

A note may be added here as to the endemic Australian species. Bentham (Fl. Austral. iii. 324) unites *M. clavellatum* Haw. with *M. australe*, although Haworth (Misc. 80) is emphatic as to its distinctness, and Berger so maintains it. In Robert Brown's MSS. he refers to this as probably identical with a plant to which he had given a name which has not been published: he also gives full descriptions of two species which he himself had found, one "in rupibus cum *M. æquilaterali* a quo distinctissimum," the other in Kent's Group, Bass's Straits, Dec. 12, 1803; as well as of a third species, apparently also found by him, to which he attaches an unpublished name of Solander*. No specimens of any of these existed in Brown's herbarium at the time when it became the property of the British Museum. Workers at Australian botany visiting this country will do well to consult Brown's MSS., which are arranged systematically and are readily accessible. It may be noted incidentally that the species usually written *æquilaterale* Haw. (Misc. 77, 1803) was first published by him as *equilaterum* (Obs. 390, 1794): the latter form stands in the *Kew Index* as "equilateratum," and its identity with the later *æquilaterale*, though stated by Haworth himself, is not indicated.

SUPPLEMENTARY NOTES TO THE HERTS FLORA.

By J. E. Little, M.A.

(Concluded from p. 52.)

Ulmus. The nomenclature followed is that adopted by Dr. C. E. Moss in the *Gardeners' Chronicle*, 1912, 199, 236. *U. glabra* and its forms were determined by A.B.J.

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* In accordance with the practice of the Department of Botany I refrain from printing these unpublished names.

U. glabra Huds. 2. Purwell, Hitchin, 1911.—Var. *laciniata*. 2. Between Willian and Gt. Wymondley, 1915.

U. glabra × *nitens*. (a) × *U. hollandica*. 2. Gt. Wymondley Rd., Hitchin, 1912. (b) × *U. vegeta*. 2. High Down, Hitchin and roadside between High Down and Old Welbury, 1916; Lower entrance to Offley Park, 1915.

U. nitens Moench. 2. Windmill Hill, Hitchin, 1916.—Var. *Sowerbyi* Moss. 2. Roadside at Nine Springs, Hitchin, 1911, det. C.E.M.

U. sativa Mill. 6. Stansteadbury, 1915.

**Quercus Cerris* L. 2. Plantation, Oughton Head, 1910; Chisfield Churchyard, 1911; Plantation at Benslow, Hitchin, 1912; St. Ippolyts Vicarage, 1912. 6. S. of Bell Bar; W. of Minwood House, 1912; Wood opposite entrance to Haileybury College, 1910; London Rd., Hatfield, alongside G.N.R.; Near the Lake Lodge Gate, Knebworth Park, 1912.

Salix aurita L. 2. Burleigh Meadows, Langley, B.E.C.R. 1912, 286.

Populus, see Journ. Bot., Aug. 1916, 233–236.

Juniperus communis L. 1. Occasional stunted specimens, depastured by sheep and seldom exceeding 6 in. high in various parts of Royston Heath, 1908–13.

Neottia Nidus-avis Rich. 2. Whitney Wood, Stevenage, 1908, E. H. Nicolls!; Offley Holes, J. Bullard; Westfield Common, 1916, H.C.L.

Cephalanthera grandiflora Gray. 1. Wood near Church Hill, Royston Heath, 1908. 2. Lower Plantation, High Down, 1912; Plantation on Weston Hills, 1911; Edge of Hexton Park, 1910.

Helleborine latifolia Druce. 2. Lady Grove, Preston, 1912; Wain Wood, 1912; Bush Wood (= Green's Grove), Weston (var. *media* E. S. Marshall? C.E.S. *in litt.*).

Orchis latifolia L. aggr. 2. Triangle between the Midland and G.N. Railways, Cadwell, 1911; St. Ippolyts Common, 1916; Near Ramerwick, 1914; Walsworth Upper Common; Purwell and Nine Springs, 1914. There is some doubt about the records of *O. incarnata* L. for the Ivel basin. The majority of our plants have unspotted leaves. On Oughton Head Common in 1915 I could only find a few with spotted leaves. The leaves, though often narrow and hooded, are not of the short rather rigid type narrowing all the way from the base. I have never seen a plant with flesh-coloured flowers in this district. The bracts vary much in length.

O. ericetorum Linton. 6. Hertford Heath, 1915.

Habenaria viridis Br. 2. Abundant in several pastures near Welbury Farm, 1908–13; Near Clothall, 1915, R.M.

Iris fœtidissima L. Green Lane, Burleigh Meadows, Langley, 1912.

Allium vineale L., var. *compactum* (Thuill.). 2. North Road, N. of Baldock, 1915, H.C.L.; London Rd. between St. Ippolyts and New England, 1908; Pit W. of Norton Green, Stevenage, 1913; Near Letchworth, between Pixmore and Baldock, 1912; S. of Almshoebury, 1912.—6. Between Datchworth and Watton, 1912;

Between Sacombe Green and High Cross, 1912; Pasture W. of Bramfield Church, 1912; By the side of the Hertford branch of G.N.R., at junction with main line, 1912.

Scilla nutans Sm. With white flowers. **2.** Westbury Wood, Offley, 1914; Near Chisfield Manor, 1911; Offley Holes, 1914; Near Tilekiln Farm, Weston, 1913.

Paris quadrifolia L. **2.** Knebworth Great Wood (Newton Wood), 1912; Westfield Common, 1916, H.C.L.!

Juncus bulbosus L. **6.** On wet clay in a riding, Great Wood, Northaw, 1912; Cow Heath Wood, Hoddesdon, 1912.

J. subnodulosus Schrank. **2.** St. Ippolyts Common, 1910.

Luzula silvatica Gaud. **2.** Knebworth Great Wood, 1911.—**6.** Along the Spital Brook, at the cross track from Monk's Green to Cold Hall, 1912.

L. campestris DC., var. *congesta* Syme. **6.** Codicote High Heath, 1912; Roman Road, Hertford Heath, 1912.

L. multiflora Lej., var. *congesta* Lej. **2.** Knebworth Great Wood, B.E.C.R. 1911, 130.—**6.** Balls Park Wood, 1915; Hertford Heath; Mardley Heath, 1913, det. C.E.S.

Lemna gibba L. **6.** Dobs Weir, Hoddesdon, 1915.

L. polyrrhiza L. **2.** Redcoats Green, 1913.—**6.** Dobs Weir, 1915.

Triglochin palustre L. **2.** Near Walsworth Spring, 1911; St. Ippolyts Common; Between Grove Mill and Hyde Mill, 1910.

Zannichellia palustris L. **2.** Ditch at top of Ickleford (Cadwell) Common, W.E.C.R. 1913, 462.

Scirpus silvaticus L. **6.** Spital Brook where it is crossed by the Roman Road, 1913.

Eriophorum angustifolium Roth. **2.** Walsworth Upper Common, 1911.

Carex disticha Huds. **2.** Swamp above Purwell Mill; Between Grove Mill and Hyde Mill, 1911; St. Ippolyts Common, 1911.

C. divulsa Stokes. **2.** Near "The Wyck," St. Ippolyts, 1912; Gt. Wymondley Rd., Hitchin, 1912; Little Almshoe, 1912; Lower Titmore Green, 1912; Near Langley School, 1910; Burleigh Meadows, Langley, 1911; Near East Hall, St. Paul's Walden; Near Stevenage Church, 1913.

C. remota L. **2.** Redcoats Green, 1910; Whitney Wood, Stevenage, 1909.—**6.** Crouch Green, Knebworth, 1911; Roadside on the Ridge Way; Callis Wood, Bayford, 1911.

C. axillaris Good. **2.** Pond S. of Dye's Farm, 1912.

C. Goodenorii Gay, forma *pseudotrinervis* A. Bennett. **6.** Crouch Green, Knebworth, W.E.C.R. 1912, 411.

C. pilulifera L. **2.** Edge of Hitch Wood, 1911.—**6.** Between Bulls Green and Bramfield, 1911; Crouch Green, Knebworth, 1911; Mardley Heath and Nimmngs Wood, 1911.

C. pallescens L. **2.** West Wood, Offley Holes, 1910.—**6.** Box Wood, near Stevenage, 1911.

C. distans L. (Inland form). **2.** Ickleford Common, 1910, det. A.B.; near Welbury Farm, 1910; Between Grove Mill and Hyde Mill, 1910.

C. Œderi Retz, var. *œdocarpa* And. **6.** Clay pits. Ponsbourne Park, and wet riding in Northaw Wood, W.E.C.R. 1912, 412.

C. Pseudo-cyperus L. **2.** Knebworth Great Wood, 1911.

C. vesicaria L. **6.** Swamp by roadside below Knebworth Park West Gate, 1911.

Anthoxanthum odoratum L., var. *villosum* Lois. **6.** Harmer Green Wood, W.E.C.R. 1913, 463.

A. aristatum* Boiss. **2. West Wood, Offley Holes, H.C.L., W.E.C.R., 1915, 558.

Calamagrostis epigejos Roth. **2.** Knebworth Great Wood, B.E.C.R. 1913, 509.

Apera spica-venti Beauv. **2.** On gravel, (late) Fells' Nurseries, near the Cemetery, Hitchin, 1915.—**6.** Waste ground, Roseland Nurseries, Hoddesdon, 1915.

Deschampsia flexuosa Trin. **2.** Whitney Wood, Stevenage, 1909. —**6.** Mardley Heath, 1915, H.C.L.

Avena pratensis L. **2.** White Hill, Hitchin, 1912; Between Little Wymondley and St. Ippolyts, 1913.

Avena fatua L., var. *pilosissima* Gray. **2.** In sainfoin, near Pirton cross-roads, 1912, det. A.B.

Sieglingia decumbens Bernh. **2.** Field on footpath from Langley to Burleigh Meadows, 1911.

Cynosurus echinatus* L. **2. In sainfoin, near West Mill, Hitchin, 1913, H.C.L. (casual).—**6.** Lane between Digswell and Welwyn, for about 100 yards along a bank, well established, 1916, H.C.L.

Molinia cœrulea Moench. **6.** Bulls Green, Datchworth, 1911.

Catabrosa aquatica Beauv. **2.** Oughton Head, Hitchin, 1911; Near Ramerwick, 1914.

Festuca ovina L., var. *capillata* Hackel (*F. tenuifolia* Sibth.). **4.** Colney Heath, 1909.—**5.** Hertford Heath, 1910.

F. elatior L. **2.** Between Grove Mill and Hyde Mill, 1912.— **6.** Between Harmer Green and Welwyn Tunnel, 1913, det. A.B.

Bromus secalinus L. **2.** Gravel pit, Nuns Close, Hitchin. B.E.C.R. 1911, 143.

B. racemosus L. **2.** Walsworth Upper Common, 1911.—**6.** Near the Rifle Butts, Haileybury Coll., W.E.C.R. 1914, 515.

B. arvensis L. **2.** In sainfoin, Purwell, Hitchin, B.E.C.R. 1914, 175; S. of "Foxholes," and near Dog Kennel Farm, and in sainfoin E. of Highover Farm, Hitchin, 1914.

Lolium temulentum* L. **2. Purwell Field, Hitchin, 1912, with var. *arvense* (With.), casuals.

Agropyrum repens Beauv. **2.** Purwell, Hitchin, 1912 (awns 3–5 mm. var. between *dumetorum* Gray, and *Leersianum* Gray?).— **6.** Waste heap N. of Welwyn Tunnel, 1912 (matches a specimen named by A.B. as var. *obtusum* Syme).

Nardus stricta L. **2.** Burleigh Meadows, Langley, 1910.— **6.** Crouch Green, Knebworth; Codicote High Heath, 1911.

NEW TROPICAL AFRICAN RUBIACEÆ.

By H. F. Wernham, D.Sc., F.L.S.

Pausinystalia angolensis, sp. nov.

Arbor trunco gracili ad 20 m. altus, nisi floribus ipsis glaberrimus. *Folia* oblanceolato-elliptica, breviter acuminata apice obtussima, basi acuta, breviter petiolata; *stipulæ* caducissima. *Flores* albi, fragrantes; *calyx* intus densissime barbatus, extus pubescens, sub limbo constrictus, limbo breviter late obtuse denticulato; *corollæ* glabræ tubus infra gracilis, insuper subito in limbum hemisphæricum dilatatus, lobis filamentosis longiusculis.

Angola: in mixed woods, Pungo Monga, 3 February, 1916, *Gossweiler* 6226!

A distinct species, readily recognizable by the indumentum and limb of the calyx, and shape of the corolla. *Leaves* ± 15 cm. × 5·5 cm., borne in a conical, shortly-branched crown at the head of a slender trunk rarely more than 30 cm. in diameter. Ovary and *calyx* together barely 2 mm. long. Tubular, lower part of corolla-tube 2 mm., upper widened part rather longer, and 3 mm. wide at mouth. Filamentous corolla-lobes 12 mm. or longer.

Dirichletia Duemmeri, sp. nov.

Frutex bipedalis glaber; *folia* lanceolata acuminata 3-verticillata; *stipulæ* vaginam truncatum formantes, inter petiolorum bases arista rigidula necnon tenui onustam. *Flores* albi gracillimi inter longiores; *calycis* limbus integer obliquissimus nec lobatus acuminatus subacuto apice.

Portuguese East Africa: Porto Amelia, July 1913, *Dümmer* 68!

A glabrous species, differing from *D. glabra* Klotsch, its nearest affinity, chiefly in the much longer corolla-tube and relatively smaller limb. The straight branchlets are quite glabrous, bearing a succession of stipular sheaths each nearly half-a-centimetre long, and surmounted. between each leaf-pair, by a slender but rigid arista 3 mm. long. The leaves are from 7 to 11 cm. long, and 1·7 to 3·6 cm. broad, tending to be obtuse at the base; stalk 1 cm. long at most. The very oblique *calyx* in the mature flower extends to about 1 cm. on the longer side and barely 2 mm. on the shorter; in the fruit the calyx is over 3 cm. × 2·3 cm. on the larger side, the stalk being fixed about 8 mm. from the nearest part of the margin. The corolla, quite glabrous externally, has a very slender tube 2·5 cm. long, and limb about 1 cm. in diameter.

Heinsia Gossweileri, sp. nov.

Frutex minima, partibus subterraneis lignosis elongatis ramosis, caule super terram brevissimo, dense ferrugineo-hirsuto. *Folia* utrinque glaberrima, elliptica v. obovata, apice nec acuminata; *stipulæ* integræ ovatæ obtusæ. *Flores* solitarii, caules nanos terminantes. *Corollæ* tubus elongatus, extus pubescens, sulcatus, lobi glabri ovati obtusi.

Angola: Kubango, in open Mumma woods, 9 January, 1907, *Gossweiler* 2408! and, without more precise locality, 4205!

A very distinct species. The leathery *leaves* attain about 4·6 cm. × 2·3 cm., with stalk 5 mm. long, and 10–12 pairs of secondary veins, the latter impressed above and prominent beneath; *stipules*, with strong midrib, 7 mm. × 4 mm. *Calyx*-lobes oblong acute, 1 cm. × 3 mm. *Corolla*-tube 3 to 6·5 cm. long, lobes oblanceolate or obovate, 2 cm. × 9 mm. or larger.

The nearest relation is apparently *H. tomentosa* Welw., readily distinguished by the indumentum, leaf-shape, etc.

Macrosphyra brachysiphon, sp. nov.

Frutex ramulis novellis minute hirtellis demum glabratis, junioribus more *Morindæ longifloræ* decurvato-patentibus, quorum in apicibus foliis paucis cum floribus 3–4 aggregatis. *Folia* plerumque obovata, maturata caducissima, illa prope flores ca. 8 × 4·5 cm., basi subcordata, brevissime acuminata acutissima, utrinque subtus præsertim in venis densius griseo-pilosa, in siccitate nigrescentia, venis secundariis utrinque ca. 7. Petiolus ad 2 cm. hirsutissimus. *Stipulæ* more generis læves striatæ concaveæ oblongo-lanceolatæ acutæ caducæ 1·5 cm. longæ. *Calycis* lobi lineares fere 1 cm. longi acuminatissimi acutissimi nec dense pilosi. *Corollæ* tubus insuper pubescens vix 2 cm. longus, lobi patentes, utrinque nisi tubum versus pubescentes glabri, late obovati ca. 6·6 × 3·5 cm. breviter acuminati acutissimi. *Stylus* e floris ore ad 5 cm. v. longius exsertus.

S. Nigeria: Degema division, Abua–Owere-were Road, *Amaury Talbot* 3764!

A handsome plant, with azalea-pink flowers. Quite distinct from the previously described species in the relatively short corolla-tube, and very large lobes.

Fadogia ancylanthoides, sp. nov.

Suffrutex hirsutus, rhizomate verticali caulibus basi lignosis validiusculis ascendentibus densissime hispidulo-pubescentibus, sparse ramosis. *Folia* ternatim verticillata elliptica acuminata subacuta, matura utrinque sparse pilosa tenuiuscula, petiolo brevissimo, densissime hirsuto; *stipulæ* e basi brevissimo vaginante longiuscule setaceæ. *Flores* 1–3 in axillis pedicellati dispositi; pedicellus qua *calyx* densissime pilosus, hujus lobi anguste lanceolati; *corollæ* pilosissimæ tubus latiusculus ad 1·5 cm. longus, lobi longe setacei.

Angola: Mononque, common in short thicket, pasturage on bank of Lower Almeidas, 13 January, 1906, *Gossweiler* 2484!

A perennial with vertical root-stock; flowers pale yellow.

Leaves 3·5–5·5 cm. × 1·8–2·5 cm., with 5–7 pairs of lateral-veins, and petiole not more than 2–3 mm. *Stipule*, sheath 2 mm., setæ 5 mm. long. *Pedicels* up to 8 mm., but usually much shorter. *Calyx*-lobes 4–5 mm.; *corolla*-tube 1·5 cm. long, and barely 5 mm. wide at mouth, lobes 1 cm. long. *Anthers* included or barely exserted at all, oblong, 1·8 mm.

Allied to *F. lactiflora* Welw., another Angolan species, but distinct in the leaf-shape and the long setaceous corolla-lobes.

Fadogia graminea, sp. nov.

Suffrutex, e rhizomate valido lignoso caulibus glabris herbaceis tamen rigidis erectis quadrangularibus necnon subsulcatis oriundis.

Folia ternatim verticillati crassiuscula, densissima, linearia, acuminata acutissima, vena media glabra subtus prominente, marginibus complicatis, supra glaberrima subnitentia, subtus dense minute flavo-pubescentia; *stipulæ* in vaginam persistentem longiusculam cohærentibus supra longiuscule aristatam. *Flores* luride flavi, in cymis alaribus paucifloris dispositi. *Calycis* lobi lanceolato-lineares aristiformes; *corollæ* extus glabræ tubus lobis oblongo-lanceolatis acuminatis acutissimis brevior; *antheræ* exsertæ lanceolatæ.

Angola: Kassuango Kuiriri, 30 September, 1906, *Gossweiler* 4353!

Collector's note: "Root-stock many-headed woody, stems strictly erect annual, leaves ascending, flower lurid yellow, dwarfy thickets grown pasturage," etc. *Leaves* as much as 10 cm. or longer, barely 3 mm. broad. *Stipular* sheath 3 mm., arista rather longer. *Calyx*-lobes 2·5–4 mm. long. *Corolla*-tube barely 3·5 mm., lobes 5 mm. long. *Anthers* 1·2 mm. long.

Distinct in the long, grass-like but thick leaves with inrolled margins. Its nearest ally is *F. stenophylla*, from which it differs mainly in the leaf-details, and character of the calyx-lobes.

Craterispermum inquisitorium, sp. nov.

Suffrutex glaber, caulibus gracilibus lævibus. *Folia* firme chartacea, elliptica, brevissime acuminata, obtusissima, breviter petiolata. *Flores* albi parvi in spicis densis dichotomis, in pedunculis complanatis insuper ampliatis, dispositi. *Bacca* acuminata pisiformis.

In moist forest, Mayombe, Portuguese Congo, 7 January, 1916, *Gossweiler* 6109!

A glabrous undershrub, like a young Coffee-tree, growing to a total height of 5 feet. The mature *leaves* measure 11 cm. × 6 cm., with rather strong petiole 1 cm. long; venation not very strongly pronounced; *stipules* shortly oblong and apiculate. *Peduncles* axillary, 2–3·5 cm., very slender at base, flattened, 2 mm. wide at apex; these bear two diverging, rather thick spikes 7 or 8 mm. long, only one flower appearing at one time. Tube of flower barely 4 mm. long; limb 4 mm. in diam. Berry 7 mm. in diameter.

Easily distinguished by the small V-shaped spikelets on flattened peduncles.

Rutidea degemensis, sp. nov.

Ramulis glabris striatis, novellis valde complanato-sulcatis; *folia* subcoriacea, elliptica acuminata, apice obtusa, basi acuta, utrinque nisi nonnunquam in venarum secundarum axillis minute barbata glaberrima; *stipulæ* late triangulares. *Flores* in cymis umbellatis trichotomis pedunculatis alaribus insuper rufo-sericeis dispositi. *Calyx* densissime rufo-sericeus, lobi lanceolati breves; *corollæ* extus sparsiuscule ferrugineo-pubescentis tubus rectus gracilis, lobi oblongi truncato-obtusi; *stylus* basin versus cano-pilosus.

South Nigeria: Degema division, *Amaury Talbot* 3827!

Leaves ± 11 cm. × 4·5 cm., with 6–7 pairs of secondary veins; *petioles* 1–2 cm. long, glabrous, striate; *stipules* 7 mm. × 6 mm. Common *peduncles*, 3–5 cm. long, secondary peduncles about half that length. *Calyx* and ovary together 3 mm. long, the calyx-lobes barely 1·5 mm. *Corolla*-tube 8–9 mm., lobes 5–6 mm. × 1·4 mm.

Remarkable for the glabrescence of the vegetative parts; distinguished from *R. decorticata* Hiern, its nearest ally, in the longer corolla-tube, which is not glabrous, and the densely hairy calyx.

Rutidea landolphioides, sp. nov.

Frutex scandens, ramulis complanato-sulcatis, novellis obsolete pilosis; *folia* elliptica v. obovata, firme chartacea, breviter acuminata, basi acuta, venis secundariis paucis (5) distantibus, subtus prominentibus, subtus in venis obscure sparse hirto-pubescentia, *petiolo* brevi appresse pubescente. *Inflorescentiæ* alares minusculæ necnon terminales majores. *Flores* parvi, nisi *calyce* minimo, minute sparse hirtello, breviter late dentato, glabri. *Corollæ* tubum brevem lobi oblongi obtusiusculi excedentes.

South Nigeria: Degema division, *Amaury Talbot* 3829!

Another ally of *R. decorticata*, distinct in the very small flowers with corolla-lobes longer than the short tube, in the venation, etc. *Leaves* 8–11 cm. × 4–6 cm., petiole ± 1 cm. *Stipules* entire, short, broad, apiculate. Axillary *inflorescences* barely 5 cm. long. *Calyx* barely 1 mm. in total length. *Corolla*-tube 4 mm., lobes rather longer. *Anthers* not quite 3 mm.

Rutidea Talbotiorum, sp. nov.

Nisi inflorescentia glaberrimus; *folia* subcoriacea late elliptica v. ovata, brevissime acuminata, apice obtusa, basi plerumque obtusa v. subrotundata; *stipulæ* latissimæ concaveæ apice rotundæ. *Flores* in cymis triradiatis leviter rufo-sericeis dispositi. *Calyx* minimus; *corolla* parva, lobis oblongis obtusis refractis.

South Nigeria: Degema division, *Amaury Talbot* 3828!

Leaves 9–11 cm. × 5–6 cm., with 6 pairs of secondary veins, and stalk up to 1 cm. long; *stipules* 6 mm. × 5 mm., soon caducous. *Calyx* and ovary 2 mm., lobes barely 1 mm. long. *Corolla*-tube not more than 6 mm., lobes 5 mm. or longer, 2 mm. broad. *Anthers* 4·5 mm. long.

Allied to *R. degemensis* just described, but distinct in the broader leaves and shorter corolla-tube.

Psychotria potamogetonoides, sp. nov.

Frutex omnino glaber, ramosus, ramulis lineis 2 e cortice prominentibus hinc verisimiliter angulatis, foliosis. *Folia* lineari-lanceolata v. oblonga, ad 8–9 cm. × 1·2 cm., olivaceo-nigra, utrinque leviter angustata apice nisi setaceo-mucronulata obtusiuscula, basi vix petiolata, margine valde crispo-sinuata dentata apparentia, venis secundariis vix conspicuis utrinque ca. 7–9; *stipulæ* deciduæ parvæ setoso-subulatæ crispæ. *Flores* in cymulis parvis paucifloris 3-radiatis terminalibus dispositi; *calyx* subtruncatus anguste infundibularis subcostatus vix 1·5 mm. longus; *corollæ* glaberrimæ tubus angustus 3–3·5 mm. longus, lobi lanceolati acuti patentes vix 1 mm. longi. *Stamina* breviter exserta.

South Nigeria; Degema division, *Amaury Talbot* 3817!

Readily distinguishable by the long narrow leaves with deeply sinuous margins.

I take this opportunity to publish an account of a particularly interesting new species of the Sapotaceous genus *Synsepalum*, collected by Mr. Talbot in Southern Nigeria some eighteen months ago.

Synsepalum glycydora, sp. nov.

Ramulis glaberrimis angulatis, mox cortice rugosulo indutis. *Folia* glabra plerumque oblanceolata, 9–17 cm. × 3·5–5·5 cm., utrinque glabra, utrinque acuminata, apice obtusissima, venis secundariis tenuibus subtus valde prominentibus utrinque ca. 10. *Flores* e ramulorum cortice oriundi sessiles; *calycis* segmenta ovata subacuta sericea; *corollæ* fere glabræ tubus gracilis e calyce 2–3 mm. exsertus, lobi pro rata angusti ca. 2 mm. longi. *Fructus* subglobosus, apice breviter acuminatus, 2–3 cm. longus, alte costatus.

S. Nigeria: Degema division, *Amaury Talbot* 3720!

Related to *S. stipulatum* Engl., but the venation is much less close, and the flowers sessile. Mr. Talbot states that the fruit has the remarkable property of affecting the palate, so that the bitterest things taste almost painfully sweet if only a small piece of the fruit be chewed at the same time. The effect lasts for some hours. These fruits may therefore have some considerable economic importance.

SHORT NOTES.

Silene anglica. In the 1915 Report of the Botanical Exchange Club, p. 329, I find the following:—"*Silene anglica* L. . . . also near High Hall Wood, Woodhall Spa, Lincolnshire, September 16, 1915. In S. Lincolnshire it is not uncommon in sandy fields on Kimmeridge Clay and kindred soils with *Filago minima*, *Scleranthus annuus*, *Silene noctiflora*, *Spergula sativa*, *Ornithopus perpusillus*, &c.—A. R. Horwood." There is no outcrop of Kimmeridge clay in S. Lincs. 53 at all. Woodhall Spa is not in S. Lincs., but in N. Lincs. 54. *Silene anglica* does not grow anywhere in this county on blown sand on this clay, so far as my records show. Mr. Horwood found this extra-areal species exactly where Sir Joseph Banks found it in 1785, and on exactly the same soil. There is no blown sand within twenty-five miles, and there are no sand beds in our local Kimmeridge clay. High Hall Wood is on chalky Boulder Clay, and the wood side where this species has grown for so long is on Plateau Gravel. It is only recorded as an outsider, a pure agricultural colonist, in six out of our eighteen divisions. It is only on the Plateau Gravel, where *S. quinquevulnera* was along with it in fair quantity sixty years ago, that it has been able to survive with us. The list of species found along with it on the Plateau Gravel is accurate enough, as far as it goes, but it is a N. Lincs. list. No mass of this same gravel in S. Lincs. known to me has such a list, though the Fen Gravel list of the southern vice-county is nearly the same, as the flora lists will show. Mr. Horwood errs in good company, for there is some strange fatality about outside botanists who visit Lincolnshire. That most accurate man H. C. Watson himself was no exception, as the first edition of the *Topographical Botany* shows. He visited this county in August 1851 to see "if buttercups and daisies grew" here. He was at Boston, which is on the north side of his own boundary the Witham. He also visited what had been the East Fen which is N.W. of Boston town. When he published his book, he included Banks's list in A. Young's *Lincolnshire Agriculture*, 1799, of the East Fen plants, but put them in S. Lincs. 53 instead of N. Lincs. 54, confusing Mr. A. Bennett and other accurate workers, who have had to write to me for an explanation.—E. A. Woodruffe-Peacock.

Carex basilaris Jord. (Journ. Bot. 1916, 141, 246; id. 1917, 55). It is satisfactory to know that Mr. G. C. Druce's sedge from Mont des Oiseaux, Hyères, though first named *C. basilaris* was subsequently corrected to the allied *C. Halleriana*, the species suggested in my note. The fact that the mistaken record was casually published in 1907 is no reason for not suggesting a correction in 1916. As Mr. Druce thinks it desirable to state that *C. basilaris* is "already recorded" from the Var, I must, in the interests of geographical botany, be allowed to repeat my own statement that it has only been recorded in that Department from the Col du Lentisque in the porphyritic Esterel mountains, not far from Cannes.—H. S. Thompson.

REVIEW.

Algæ. Volume I. Myxophyceæ, Peridinieæ, Bacillarieæ, Chlorophyceæ, together with a Brief Summary of the Occurrence and Distribution of Freshwater Algæ. By G. S. West, M.A., D.Sc., F.L.S. Demy 8vo, cloth, pp. viii, 475; 271 figg. Cambridge University Press. 1916. Price 25*s*.

Prof. West's is the first of the new series of *Cambridge Botanical Handbooks*, edited by A. C. Seward and A. G. Tansley, and may presumably be taken as a type of the whole series. The appearance of the volume is decidedly attractive; the type is large and clear, the paper excellent, and the abundant illustrations are arranged and reproduced to the best advantage. One is inclined to wonder whether a somewhat less sumptuous production would not have satisfied all needs without in any way interfering with the utility of the book. The price can only be described as prohibitive, and we fear will necessarily limit the circulation of the book in just those circles to which it is intended to appeal.

The present volume deals only with the Myxophyceæ, Bacillarieæ, and Chlorophyceæ (incl. Isokontæ, Akontæ, Stephanokontæ, and Heterokontæ), and concludes with a section on the occurrence and distribution of freshwater Algæ. The remaining groups will form the subject of a second volume. A comprehensive account of the Algæ in the English language, has long been an urgent necessity, which was in no way satisfied by the author's *British Freshwater Algæ*, valuable as that work was from a systematic point of view. Prof. West, with his unique knowledge of the Algæ, is perhaps better fitted than anyone else to write a book on this group and, with certain qualifications, it may be said that he has succeeded in an admirable manner. The volume contains an abundance of valuable information, most of which has been sifted critically by the author, and one can only praise without reservation the clear and lucid style and the able way in which the facts are presented.

The most obvious criticism is that the book is dominated too largely by a systematic atmosphere, making it indeed an excellent introduction to a taxonomic study of the Algæ, but decreasing its value from the point of view of the student of comparative morphology and phylogeny. This is more apparent in the portion dealing with the Chlorophyceæ—in which the author, for stated reasons, adopts a sectional treatment—than in the very excellent accounts of the Myxophyceæ, Peridineæ, and Bacillariales. The Chlorophyceæ are divided up into numerous short sections that make rather dull reading and obscure the many points of contact between the different subdivisions; in our opinion a more collective treatment would have been possible. The dominance of systematic considerations is also evidenced by the inclusion of many minor details that are only relevant in taxonomic work and are unnecessary in a book of this kind, since they are to be found in the various monographs dealing with the different subdivisions of the Algæ.

To some extent morphological considerations have suffered at the expense of systematic detail. As instances, we may mention that the author gives no detailed account of the mode of development of the daughter-colonies in the Volvoceæ, that there is no reference at all to Senn's work on *Cœlastrum* and other Protococcales or to Berthold's work on the branching of various Algæ, and that no mention is made of the relatively permanent *Palmella*-stages of certain species of *Chlamydomonas* (e. g. *C. Kleinii*), which must be regarded as of importance from the evolutionary point of view. These are not the only places in which a more comprehensive morphological treatment would have been desirable; but, on the other hand, there are many sections which are quite admirable in the wide treatment they have received. As special instances we may quote the whole section on Myxophyceæ, the account of movements in Diatoms, the summary on methods of culture of green Algæ, and the section on Conjugatæ.

The general scheme of classification may be said to be in line with modern views. The chief criticism to be made is the author's inclusion of the Heterokontæ as a subdivision of the Chlorophyceæ. There is no evidence at all to show that the Flagellate ancestry of the Heterokontæ had anything in common with that of the Isokontæ, and the two groups appear as sharply demarcated from one another as any of the groups of the Algæ. As regards the other subdivisions of the Chlorophyceæ, the present writer regards the adoption of the names Akontæ and Stephanokontæ as unfortunate, as they appear to lay emphasis on comparatively irrelevant characters. The Conjugatæ are by no means the only series of Green Algæ in which motile elements are lacking, and the numerous cilia of the zoospore of Œdogoniales are probably to be related to the unusually large size of the zoospore. Conjugatæ and Œdogoniales are better regarded as early offshoots from the line of evolution of the Isokontæ.

The author reverts to the old names *Stigeoclonium* and *Sirogonium*, the generic name *Protococcus* is substituted for *Pleurococcus*, and the genus *Chlorococcum* is now accepted as an independent one. The merging of *Endosphæra*, *Scotinosphæra*, *Chlorocystis*, *Stomatochytrium*, and *Centrosphæra* in the genus *Chlorochytrium* is advocated, a view with which most algologists are likely to concur. Other systematic points that call for notice are the inclusion of *Protoderma* in the Chætophoraceæ, of *Vaucheria* in the Siphonales, and of *Rhaphidonema* in the Ulotrichaceæ, all quite in accordance with modern views, although *Rhaphidonema* would perhaps find a better place in the Chætophoraceæ. On the basis of Griffith's work *Glaucocystis* is retained among the Myxophyceæ, but some will prefer to preserve an open attitude of mind on this question until more is known about the cytology of the species of *Oocystis*, with which there are undoubted points of contact. We should have preferred to have seen the Volvocales treated as an order separate from the Protococcales, although that is a matter of opinion. Nor does it appear desirable to separate the Ulvales and Schizogoniales from the Ulotrichales. The classification of the Heterokontæ adopted is largely that suggested by Pascher.

At the end of each section there is a comprehensive bibliography, including most of the literature of importance dealing with the different groups. Amongst papers which we think should have been cited are Murray and Whitting's on the Peridineæ, Senn's on Protococcales, Heinricher's on *Sphæroplea*, and some of Comère's publications on algal ecology.

The section on the occurrence and distribution of freshwater Algæ will be of great value to the student, since it is almost the first attempt to classify Algæ according to their habitat. From the ecological point of view, one cannot help feeling that more might have been done in the way of description of definite algal associations.

F. E. Fritsch.

BOOK-NOTES, NEWS, ETC.

We have heard with deep regret of the death of Mrs. Talbot at Degema, Southern Nigeria, on December 28th last. Readers of the Journal will have become familiar with the name from the descriptions of new species published from time to time in its pages. During the past eight years Mr. and Mrs. Talbot have sent at intervals to the Department of Botany, British Museum, the results of their botanical exploration in Southern Nigeria. Mr. Talbot's time has been much taken up with his Government work, and the principal labour of making the collections fell to Mrs. Talbot and her companion and sister Miss Amaury. Mrs. Talbot also made an extensive series of beautiful coloured sketches which with her notes on the plants have been very helpful when working out the collections. From 1909 to 1912, during the period of Mr. Talbot's Government service in the Oban District, extensive collections were made in this rich botanical area just west of the Cameroons. These were worked out in the

Department of Botany and an account of them was published in 1913 as a British Museum Catalogue. More than a thousand species and varieties are enumerated, and of these twenty per cent. are new, including nine new genera: speaking botanically this represents the most productive piece of the Talbots' work. In 1911 they accompanied Miss Olive Macleod on an expedition to Lake Chad and the Bornu district, passing through part of the North Cameroons and French Ubangi; a list of the plants collected on this journey forms an Appendix to Miss Macleod's *Chiefs and Cities of Central Africa*. Since 1912 Mr. Talbot's work has lain in the Eket and Degema districts, which are nearer the coast and have a less varied and botanically interesting vegetation than that of the Oban Highlands. Nevertheless the work of collecting was continued assiduously, and many new or otherwise interesting specimens reached the Museum from time to time. When Mrs. Talbot bade us good-bye to return once more to Nigeria last summer, she was full of enthusiasm and looking forward to the possibility of being able at some time to revisit the Oban district. In her last letter to me, she writes, in October, "we have a scheme for carrying out your wishes with regard to Oban, which we think could possibly be worked next tour; however we can talk that over with you when we come back, if we are spared to do so." Mrs. Talbot was not merely a collector but was keenly interested in the plants, and her letters are full of useful notes. She was specially interested in the genus *Napoleona*, and had made careful drawings of the flowers of the various forms with a view to a monograph which Mr. E. G. Baker was preparing, based largely on Mrs. Talbot's specimens and sketches.—A. B. R.

Dr. Sarah M. Baker and Miss Maude H. Bohling (afterwards Blandford) have made a special study of the peculiar forms of Fucaceæ ("On the Brown Seaweeds of the Salt Marsh" in Journ. Linn. Soc. xliii. 1916, pp. 325–380, 3 pls. & figs.) which occur conspicuously on some salt-marshes, their relation to recognized systematic species, and the effect of the physical conditions of the marsh upon the morphology of the plants. Of our common littoral Fucaceæ—(1) *Pelvetia canaliculata*, (2) *Fucus spiralis*, (3) *Ascophyllum nodosum*, (4) *Himanthalia lorea*, (5) *Fucus vesiculosus*, (6) *F. serratus*, (7) *F. ceranoides*—it is to numbers 1, 2, 3, 5, and 7 that the marsh forms are traced by the authors. These ecological forms have hitherto been neglected or misunderstood by previous writers. They are derived from the fixed known saxicolous plant in two ways, either by direct vegetative budding, or by the modification of young plants germinating upon a salt-marsh. Each individual species undergoes a series of striking morphological modifications in the transition from rock to salt-marsh, and the adaptational varieties so produced are termed 'ecads,' and are persistent through many vegetative generations. The marsh ecads of the five species, being all of the same general type, are grouped together under a "megecad *limicola*." This then includes all the marsh-dwelling Fucoids as distinguished from those of saxicolous habit. The characteristics of the megecad *limicola* are briefly:—(1) Vegetative Reproduction,

(2) Dwarf Habit, (3) Absence of Attachment Disc, (4) Spirality or Curling of the thallus. The methods of investigation employed by the authors show that Dwarf Habit is due to prolonged exposure to the air and diminished immersion in the water; that Curling or Spirality is probably due to an unequal distribution of water and nutrient salts upon the thallus as it lies spread out on the intertidal mud; that Vegetative Reproduction is probably favoured by the constant humidity of the intertidal mud, thus preventing that concentration of cell-sap which is necessary as a stimulus for the production of receptacles and for the maturing of sexual organs. The species to which most of the marsh ecads are traced is *Fucus vesiculosus*. The authors add that "an examination of the famous floating Sargasso weed revealed the interesting fact, that its peculiarities could be referred to the same physical factors as those of the marsh Fucoids—a confirmation of Börgesen's contention that it is produced and reproduced vegetatively from one of the saxicolous Sargassums."—A. G.

THE *Twenty-first Annual Report of the Moss Exchange Club* (York: printed by Coultas & Volans, Ltd. April 1916, pp. 145–176), issued by Mr. W. Ingham, Hon. Secretary, contains a statement by the Distributer, Mr. P. G. M. Rhodes, that an exceptionally large number of critical and off-type specimens had been sent in by the members, thus throwing more work upon the referees, whose criticisms are accordingly the more valuable and interesting and do much towards the elucidation of difficult forms. The notes under *Sphagnum subsecundum, Fontinalis antipyretica, Plagiothecium Ræseanum*, certain harpidioid species of *Hypnum*, and *Hypnum palustre* var. *subsphærocarpum*, are of special interest. The last named variety has given great trouble to our bryologists. The British plants referred to it differ from the Pyrenean type in shape of capsule, and consequently need a distinctive name; this is supplied in the appendix—*Hypnum palustre* var. *dolichoneuron* Ingh. & Rhodes.—A. G.

AT the meeting of the Linnean Society on 18th January, Professor F. O. Bower, Sc.D., F.R.S., F.L.S., gave a lecture on "The Morphology of the Sorus of Ferns," the following theses being maintained and illustrated in a long series of lantern-slides of living and fossil species:—1. The isolated sporangium (monangial sorus of Prantl) is frequent among primitive Filicales. 2. The distal or marginal position of the sorus is prevalent in primitive types. 3. The transition from a marginal to a superficial position has frequently occurred. 4. Interpolation of sporangia has led to increased complexity of the sorus. 5. In simple, gradate, and mixed sori thus constituted the receptacle varies: it is not a stable entity, but a result of elaboration of the vein-ending on which the sporangia are seated. 6. Superficial extension of sori occurs 7. Duplication of sori also occurs. 8. Fusion of sori also occurs progressively in various phyla. 9. The fusion-sorus may disintegrate, but not necessarily along the original lines of fusion. 10. The identity of the sorus may be lost by acrostichoid development, which has occurred along numerous lines of phyletic advance. 11. The more complex sori of Ferns, as they are now seen, are referable along such lines of comparison to marginal or distal monangial sori. 12. Such a position of isolated or few sporangia is found to prevail in plants of the Lower Devonian Period. 13. The marginal placentation of Seed-Plants is probably more than a mere analogy.

At the meeting of the same Society on Feb. 1, Mr. C. E. Salmon read an interesting paper, illustrated by specimens, on plants likely to occur in Britain. We hope to print this *in extenso* at an early date. To the same meeting Messrs. Charlesworth and John Ramsbottom contributed a paper "On the Structure of the Leaves of Hybrid Orchids." An investigation of the various anatomical characters of the leaves of the parents and their hybrids—cuticle, epidermis, water-storage tissue, mesophyll, vascular bundles, sclerenchyma, structure and shape of midrib, etc.—shows that, as a general rule, a structure when present in both parents in different amounts, appears in the hybrid intermediate in every way—quantity, distribution, size and shape of parts, etc. This can be well seen by observing the microscopic characters of hybrids which have one parent in common; *Cochlioda Noezliana* occurs as the female parent in six of the primary hybrids investigated and in the two secondary ones: the water-storage tissue and the number of rows of vascular strands show the point very clearly. When a character is present in one of the parents, it may or may not be found in the hybrid: *e. g.*, the leaf of *Epidendrum prismatocarpum* shows a large amount of crystalline substance; the leaves of the hybrid *Lælia cinnabarina* × *E. prismatocarpum* show these crystals, but not in such great quantity; the leaves of the hybrid *Lælia tenebrosa* × *E. prismatocarpum*, on the other hand, do not show any crystals. In general, if the character of one parent does occur in the hybrid, it is much less developed than in the parent.

Canon Bullock-Webster publishes in the *Irish Naturalist* for January an account of the *Characeæ* of the northern lakes of the Fanad peninsula, East Donegal, which he studied last summer. He records a number of forms hitherto unrecorded for the district, including one plant which "at present defies identification."

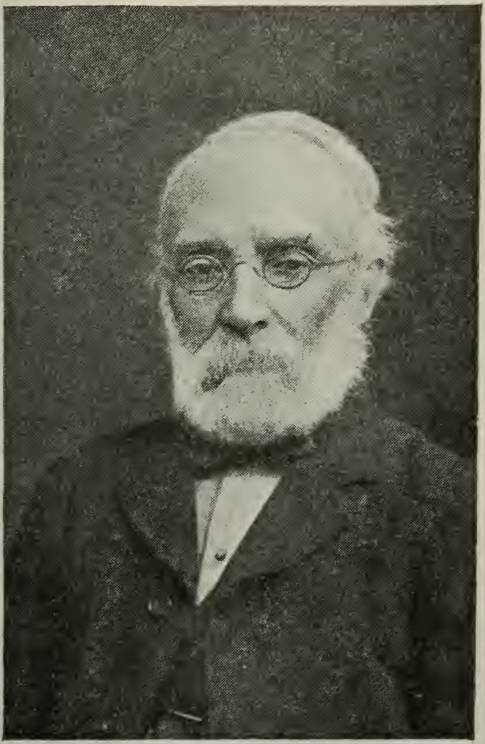
Dr. Salisbury publishes in the December number of the *Journal of Ecology*, which for the present is being edited by Dr. Tansley, an interesting paper on "The Emergence of the Aerial Organs of Woodland Plants." To the same number Mr. Harold Jeffreys contributes a paper "On the Vegetation of Four Durham Coal-measure Fells"—Waldridge, Beamish, Birtley, and Tinkler: and Mr. J. W. Bews "An Account of the Chief Types of Vegetation in South Africa, with Notes and Plant Succession."

Dr. C. E. Moss left England early in the month to take up his new duties as Professor of Botany, at the South African School of Mines and Technology at Johannesburg—not, as erroneously stated in our last issue, at the South African University. The post is newly created, and we hope that amid the necessary duties of organization, Professor Moss will find time and opportunity for the taxonomic and ecological work for which he is eminently fitted.

IN MEMORY OF DANIEL OLIVER
(1830-1917).

By James Britten, F.L.S.

By the death of Daniel Oliver at the advanced age of 86, England has been deprived of one who, during his long period of scientific activity, stood in the foremost rank of systematic botanists. To the present generation his name will be unfamiliar, except in so far as his patronymic is associated with his son, who succeeded him in his professorship; but the older among us, and indeed systematists generally, cannot fail to have been acquainted with his work and will join with me in paying tribute to his memory.



Daniel Oliver was born at Newcastle-on-Tyne on the 6th of February, 1830. He was educated at Wigton, at the school of the Society of Friends—a body from which so many of our botanists have come, and of which he always remained a member—and early showed a marked interest in natural history. His first contribution to science is a note in the *Phytologist* (ii. 986: 1847) on the plants of Bouldersdale and Teesdale; this is signed "Daniel Oliver tertius," the writer being the third bearer of the name: hence it will be seen that, in common with most botanists who in later life have achieved distinction, Oliver's first work was among British plants. Notes of a visit to Ireland in 1850 and of a second in 1852 appear in the same journal (iv. 125, 176). It was during the first of these visits that he added *Naias flexilis* to our flora: other communications, relating to Northumberland plants, are in the *Transactions of the Tyneside Naturalists' Field Club*, of which Oliver was an active member. In 1853 he became a Fellow of the Linnean Society, of which body he was at the time of his death the oldest Fellow. At the anniversary meeting in 1893 the gold medal of the Society was presented to him by the then President, Prof. Charles Stewart, who paid a high tribute to Oliver's work, which had to a great extent been published in the Society's *Journal* and *Transactions*, and of which he gave an interesting summary (see Proc. Linn. Soc. 1892–3, 19). In a characteristically modest reply Oliver deprecated the honour conferred on him on the ground that he was "almost absolutely destitute of the great hankering after research which characterized modern science," adding that when, in 1884, the medal of the Royal Society (of which he was elected a Fellow in 1863) was conferred on him, "instead of exchanging it for some apparatus for research, some rare book, or some powerful lens, [he] exchanged it for a little water-colour drawing."

In 1858, at the invitation of Sir William Hooker, Oliver came to Kew and took up work in the Herbarium. His first systematic papers were on *Utriculariaceæ* (Journ. Linn. Soc. iv.: 1860). These were followed by others, too numerous to mention individually, all marked by the painstaking accuracy which characterized Oliver's work, no matter in what direction: probably no one's genera and species have been more generally retained in the light of subsequent knowledge and research. But the papers which stand under his name represent only a small portion of Oliver's undertakings: both Bentham and Sir Joseph Hooker have acknowledged their indebtedness to his help: the latter found his work both in the *Botanical Magazine* and the *Icones* materially aided by Oliver, who was accustomed to bring together for him the specimens with the principal figures and descriptions bearing upon them of each species, so that the material was ready to Sir Joseph's hand as soon as he was prepared to use it. It is no disparagement to Sir Joseph's great capacity and wonderful power of work to say that his labours were greatly facilitated by Oliver's ready and willing co-operation.

In 1864, Allan Black, the Curator of the Herbarium, retired on account of ill health, and Oliver (who later commemorated him in the genus *Allanblackia*) was appointed Keeper of the Herbarium and Library—a post which he held until his retirement in 1890. The manner in which Oliver discharged the duties of his office is so well summed up by Dr. Hemsley in the *Journal of the Kew Guild* for 1898 that I cannot do better than reproduce it:

"During this period he worked with untiring zeal on the constant influx of collections from all parts of the world, and set an example of punctuality and conscientious devotion to duty that has not failed to produce good fruits. Indeed, it was the discharge of his duties that prevented him during later years from continuing the valuable contributions to scientific literature which had procured him a distinguished position among botanists of all countries. He studied all branches of botany, but his fame will rest on his unrivalled knowledge of flowering plants. This vast store of knowledge has always been open to all who chose to consult him, and its direct influence on the writings of others is only known to the few intimately connected with his official life. Probably no one man ever knew so much as he of those aberrant types which puzzle the most experienced botanists."

Oliver's work at Kew was not confined to the Herbarium. Almost as soon as he arrived there, he began and carried on from 1859 until 1874, when a government grant was allowed for the work, a series of lectures to the garden staff. The first official Guide to the Museums (1861) was from his pen, and in 1872 he published a new and interesting Guide to the Gardens. Apart from his systematic papers, perhaps his most generally useful publication was the *Lessons in Elementary Botany*, which, first published in 1864, has gone through numerous editions, the last bearing date 1910. Its method differed widely from the popular manual as understood by previous and subsequent writers: "gather, *first of all*," it said, "a specimen of the Common Buttercup," and, proceeding from the known to the unknown, this simple text was developed into an introduction to the characters of the principal orders of the British Flora. Of this, in 1869, he produced an adaptation as a *First Book of Indian Botany*, "any common annual weed" being substituted for the buttercup, the text and illustrations relating of course to the country for which the book was prepared. Previous to this, he had, in conjunction with W. H. Fitch, drawn up for the Science and Art Department of the Council of Education, a series of coloured illustrations with accompanying letterpress of the principal natural orders of plants: these were in 1874 issued in volume form.

Reference has been made to Oliver's work as a lecturer. In 1861—the year of his marriage—he succeeded Lindley as Professor of Botany at University College, a post which he resigned in 1888 and which has now for many years been held by his son. In order that his Kew work should not in any way be interfered with, he delivered his lectures at 8 A.M. In 1870, when I was living at Chiswick, I attended a course of these: locomotion was not as easy then as it is now, and it was necessary to start before 7 in order to ensure arriving in time. Admirably clear as were the lectures, and fully illustrated by specimens—Oliver always arranged that there should be one for each student—I do not think he was an ideal lecturer: his manner was somewhat jerky and abrupt, and was not such as to encourage questioners—indeed, I do not remember that such a one ever presented himself. Oliver also lectured on Botany at the South Kensington Museum.

When I entered the Herbarium in August, 1869, Kew was at the height of its reputation as the recognized centre of systematic botany.

Hooker and Bentham were at work on the second volume of the *Genera Plantarum*—the former was also carrying on the *Botanical Magazine* and the *Icones Plantarum*; the latter was about halfway through his *Flora Australiensis*; Oliver was preparing the second volume of the *Flora of Tropical Africa*, to which Mr. J. G. Baker, who had not long begun the *Refugium Botanicum*, was a principal contributor. The National Herbarium at the British Museum, in cramped quarters and inadequately staffed, had not then attained the position which on its transference to South Kensington it speedily secured; and although those who were aware of its historic treasures did not neglect to consult them, Kew was, as indeed it still is, to a large extent, the centre to which continental and transatlantic botanists naturally gravitated. Among these the explosive H. G. Reichenbach and the kindly Asa Gray impressed themselves most vividly on my memory: there was of course a large Indian contingent, which included Thomas Anderson, John Lindsay Stewart, and others. Daniel Hanbury came in connection with his important researches into the history of drugs which took ultimate shape in *Pharmacographia*; he was one of the comparatively few visitors whom Oliver seemed glad to see, for the latter was impatient of interruption, and inquirers in search of casual information found short shrift at his hand—indeed among the things which struck me most when I left Kew for the British Museum was the almost excessive willingness of Mr. Carruthers and Trimen to be helpful to anyone who came. And very odd people did come, though I think it was not until we were at South Kensington that we were consulted as to the discovery of gold in the petals of charlock, the identity of the "forbidden fruit" with the Double Coco-nut, the relation of Britain to the Ten Lost Tribes. I myself, some years before, had experienced Museum courtesy, for venturing, with much nervousness, to take there a casual for identification, I was received by J. J. Bennett, the then Keeper of the Department, of whom I have a vision as of a benevolent presence with its hands beneath its coat-tails, who introduced me to Mr. Carruthers, then occupying the seat which I was afterwards to fill.

Of course to genuine workers Oliver was always attentive enough, but his rapid speech and jerky manner certainly tended to intimidate the nervous, and, until I became used to them, alarmed me a good deal. I never knew a man who seemed so continually at high pressure: to meet him walking, always at a rapid pace, through the Gardens or to hear him running up or down stairs was in itself an object-lesson on the importance of time and the necessity of making use of every fragment of it.

This however was during his working hours: it was not long before I was invited to spend an evening at his house—an invitation from time to time renewed and always gladly accepted—and I then had the opportunity of appreciating the restful and artistic side of Oliver's character. Ruskin was at the height of his reputation and the English Pre-Raphaelites were in vogue. Oliver was a devoted admirer of Ruskin, whose personal acquaintance was to come later.

It was in 1869 that Oliver first began to devote his leisure to drawing—to the pursuit of which his later years were mainly devoted. His first important work was in sepia: black and white followed later, succeeded by water-colour which in its turn gave place to studies in oil. His holidays were spent in sketching—first in North Wales, then in Cornwall, Jersey, France—in later years in the north of England: the sketches made at these times were developed during the succeeding months. He had a small but choice collection of water-colours, mainly the work of Alfred W. Hunt, of which he had a high appreciation: to this he devoted the fees received from his lectures. The works of Turner he held in supreme admiration; he copied the drawings of the *Liber Studiorum* and hung the nursery with them, so that his children might early become familiarized with the best work. He was accustomed to walk along the river-bank in the hour which intervened between his work at the Herbarium and his evening meal, and I was sometimes privileged to accompany him, learning from his talk much about Turner and art generally.

It was during one of these walks in 1871 that I diffidently referred to the vacancy in the Department of Botany in the British Museum caused by the resignation of Mr. Bennett and by the promotion of Mr. Carruthers to the Keepership, and Oliver at once asked if I was thinking of applying for the post—"going in for it?" was what he said, followed by—"if you do I think you'd get it." I had hardly formulated a view on the matter, but this rather decided me: the salaries in the Kew Herbarium were at that time very low—mine when I went in was £80. My application was entertained, and Oliver, although he said he was sorry to lose me, kindly prepared my way for an interview with Hooker, who, not unnaturally, resented my leaving so soon.

In the summer of 1874 Oliver invited me to join him at Auxerre, in the Department of the Yonne. It was the first time I had been abroad, and the memory of the fortnight then spent will always remain among the pleasantest of my life. Oliver devoted himself to sketching with characteristic energy, going out before breakfast, and working all day. The poplar-clad banks of the Yonne afforded abundant occupation, varied with studies of the architecture of the charming old town, especially of the cathedral, which from various aspects formed a centre of interest. From Auxerre as a centre, we went to Pontigny, where the Pères de St. Edme, since dispossessed of the great Abbey where lies St. Edmund of Canterbury, received us with much hospitality, cramming our little coffee-cups with sugar until the coffee almost disappeared. We went to Vézélay, where the first Crusade was preached, and where the great church, somewhat too well restored by Viollet-le-Duc, afforded Oliver much material; and to Avallon, where, while Oliver was sketching in the *place* opposite the church, two little French schoolboys, with satchels on their backs, came up to us, took off their hats, and said "at each word pausing, slow" with much solemnity, "Ow do you do milor O yes!" and then withdrew. Then we went to Chartres and morning and evening studied the wonderful thirteenth-century windows, with their glowing colours, most wonderful of all the light blue, at once translucent and opaque which suggested Huysmans' phrase for the cathedral—"la vierge blanche aux yeux bleues." The corn being cut, we wandered over the great plain of La Beauce, to a little village, surrounded by mud walls, which we walked through without seeing a single inhabitant; and, looking back, saw across the flat the spires of the cathedral miles away. It was at this time that Oliver was copying the architectural treatment of plants and animals, some of which he subsequently reproduced decades (in 1882–6) for private circulation under the title *Plant and Animal Forms as used by Workmen of the Middle Ages in Decoration chiefly of French Churches.* Of these there were five fascicles, the drawings principally from Amiens, Laon, Soissons, Beauvais, Senlis and Noyon. The last fascicle is entirely devoted to Chartres; sitting in the north porch, we found a small square of decoration filled by a large compound leaf which suggested an umbellifer but did not quite correspond with any we could recall: Oliver set to work to draw it, and I idly with a paper-knife began to remove the dirt which had filled up the ground of the design. Presently something appeared; this, when fully uncovered, proved to be the flower of a Columbine, which, with this clue, it was evidently the leaf represented. Chartres is especially rich in floral representation: *Ranunculus repens*, sometimes very vigorously treated, is a favourite subject, and there are fine studies of Oak and Ivy.

Ruskin was much interested in these reproductions: of the third decade he wrote—"Quite the best I have ever seen. . . . Your Amiens work is magnificent and skilful and truthful—to the nearly highest point." The studies of roses from Amiens—sometimes as moulding, in one case a great stem with flowers and branches—are of great beauty. As appears from various passages in Ruskin's writings, he was accustomed to apply to Oliver for botanical information; he gave him a charming little drawing of poplars and occasionally visited him at Kew. Oliver used to discuss the propriety of dedicating a genus to Ruskin, but his strong feeling that such distinction should only be conferred on those who, either as botanists or collectors, had benefited science, prevented this from being done. It is to be regretted that the publication by Ventenat (Jard. Cels. t. 21) of a genus *Oliveria* should have prevented the natural tribute to the subject of this memoir: the more so because the name involves a mis-spelling, the naturalist thereby commemorated being G. A. Olivier.

At the end of May, 1890, Oliver retired from the Keepership of the Herbarium—an event marked by the presentation of an address from the members of the Kew staff. The presentation was made by Mr. I. R. Jackson—then Curator of the Museums, and the oldest member of the staff and now the oldest Associate of the Linnean Society—who had arrived at Kew at the same time as Oliver and was one of his earliest friends there.

For some time Oliver continued to visit the Herbarium, chiefly in connection with the *Icones*, of which he had become editor; but, to the loss of botany, he resigned that position at the end of 1895, owing, it was understood, to differences with the then Director, Mr. (afterwards Sir) W. T. Thiselton-Dyer.

In the year following his retirement, the University of Aberdeen conferred on Oliver the honorary degree of LL.D.; he had already been honoured by Edinburgh, where in 1882 he was elected one of the six Honorary Fellows of the Botanical Society.

After 1905, Oliver, though still continuing to live at Kew, retired into private life. He took up gardening and devoted more time than ever to his pictures, of which his studio was full. He had become much interested in music, chiefly in the works of Bach and Mozart, of which one of his daughters was a competent interpreter. "Throughout a long life," says the *Friend* of Jan. 12th, "he rarely suffered from ill-health, and he retained to the last the full use of his faculties. His death [on Dec. 21], which followed a few days' illness, was swift and peaceful." He was buried in the burial-ground connected with the Friends' meeting-house at Isleworth, at which he had been a regular attendant.

There is a pleasing portrait of Oliver in the Kew Herbarium which was painted in oils in 1893 by J. Wilson Forster and presented by members of the staff and others. An early photograph at the Linnean Society represents him as I remember him best with a black beard; a later, perhaps the most characteristic of the photographs, was given as a frontispiece to the *Journal of the Kew Guild* for 1898. That given on p. 89 was taken in late life; a yet later one, reproduced in the *Friend*, appeared in a group of the four Keepers of the Herbarium—Mr. Baker, Dr. Hemsley, and Dr. Stapf being the other figures.

SOME PLANTS THAT MAY OCCUR IN BRITAIN.

By C. E. Salmon, F.L.S.

The following notes were submitted to the Linnean Society at its meeting on Feb. 1st. It is thought that any practical results which may follow their publication may be more readily obtained if they are brought before the British botanical public in this Journal rather than in that of the Linnean Society, and they are therefore published here.

It is of course not easy to predict what species are likely to occur, especially as our list already includes plants, undoubtedly native, which, from their Continental distribution, would hardly be expected to be found in Britain. On the other hand, if one attempted to enumerate all the species, subspecies, varieties or forms which, from their known geographical distribution seem likely to be found in these islands, a very long list might be compiled.

My present purpose is to take only a few well-defined species, to point out how they may be distinguished in the field or herbarium, and to compare them with their nearest British allies.

Ranunculus ololeucos Lloyd.

This was described by Lloyd in 1844 and is closely allied to *R. tripartitus*. It differs however in one very obvious character and in two or three minor, but apparently unvarying, features; at a glance the larger pure-white flowers of *ololeucos* contrast strongly with the small yellow-based petals of *tripartitus*, whilst upon a closer examination Lloyd's plant will be found to have more numerous carpels in each head with beaks of decidedly a greater length.

The plant we used to call the variety *intermedius* of *tripartitus*, which now bears the name *lutarius* Bouvet, lacks the truly capillary, extremely fine submerged leaves of *ololeucos* and *tripartitus* and differs in having the floating leaves less deeply divided, with the segments broader and more rounded.

R. ololeucos has been found in France, both in the Western portion (where Lloyd obtained his original examples) and in Normandy, also in Scandinavia, Denmark, Germany, Holland and Belgium; it is thus quite possibly an overlooked inhabitant of East Anglia or Southern England.

Cerastium brachypetalum Desp.

This has a very wide distribution which includes the greater part of Europe, where it is found in Denmark, Sweden, Germany, France and Belgium.

Its nearest British ally is *C. glomeratum*, of which the form Rouy has called subvar. *elongatum* has a somewhat similar habit. From this, however, *C. brachypetalum* differs in various minute though constant particulars, the most important being the long hairs on the filaments, the long fruiting-pedicels and their remarkable curving at the summit. This last feature recalls the somewhat similar behaviour of the pedicels in *C. pumilum*.

From *C. triviale*, of which perhaps rather than *C. glomeratum*, it has more the general facies at first glance, *C. brachypetalum* abundantly differs in being an annual and in having its bracts wholly herbaceous with no scarious margin, as well as by the characters already mentioned.

Alsine dunensis Corbière.

This occurs on the dunes and in sandy places on the coast of Normandy, and will probably be found in the Channel Islands in similar situations. It should be looked for quite early in the year, as I have specimens gathered by Corbière on May 31st possessing capsules which have already shed their seeds. It may be distinguished from *A. tenuifolia*, to which it is closely allied, by its extremely upright strict habit with the top of pedicel and calyx glandular-hairy, but above all, by its corymbiform and dense cymes of flowers with short pedicels which do not lengthen in fruit, and by its short capsule.

Prof. Corbière satisfied himself that his plant was neither *A. hybrida* Jordan (which is also glandular-hairy) nor *A. viscosa* Schreb., whilst *A. laxa* Jordan was out of the question owing to its very different habit.

Rouy and Foucaud (Fl. Fr. iii. 279, 1896) place Corbière's plant as a dwarf variety under *A. conferta* Jordan, and note that the habitat (Northern France) of the variety is interesting as *A. conferta* seems confined to the Southern regions of that country.

SPERGULA MORISONII Boreau.

This Spurrey is particularly interesting to British botanists as it is closely allied to *S. pentandra* L., which is recorded in Ray's *Synopsis*, ed 3, 351 (1724), as having been observed in sandy places in Ireland by Sherard.

Mr. Druce has satisfied himself that the original example from Sherard in the Dillenian herbarium is certainly *pentandra* and not *Morisonii* and, in an interesting account in the *Annals of Botany*, iv. 378 (1890), is disposed to consider the former a true native of Ireland; the subject is further discussed by Mr. Britten in this Journal for 1890, p. 302.

However, *S. Morisonii*, with its known distribution in Scandinavia, Denmark, Germany, Belgium, Holland, Normandy, etc., would seem more likely to occur in these Islands than *S. pentandra*, which is much more easterly in its range.

S. Morisonii is recorded as British by Nyman, Richter, Rouy, etc., but probably all the records are based upon the old Irish entry of Ray mentioned above. On enquiry in 1910, M. Rouy was unable to recollect on what source he based his statement in Fl. de France and could only refer me to the authors quoted above.

Bearing a somewhat similar superficial resemblance to our common *S. arvensis*, both *S. pentandra* and *S. Morisonii* differ in possessing seeds broadly winged and leaves not channelled beneath; the particular specific characters of *S. Morisonii* lie in its dense fascicles of leaves, obtuse petals and seeds with wings narrower than their own diameters.

VERONICA OPACA Fries.

This, in Fries's *Novitiæ Floræ Suecicæ*, p. 64 (1819), immediately follows *V. agrestis*, to which and to *V. polita* it is closely allied.

It may, however, be separated from both by its calyx-lobes, which are elliptic-oblong or spathulate, obtuse and densely hairy; by its capsule with simple non-glandular hairs and style equalling or just exceeding notch and by its larger seeds ($1\frac{3}{4}$–2 mm. long), 2–4 in each cell.

In *V. agrestis* the calyx-lobes are oblong, obtuse, and but sparingly hairy; the capsule has many glandular hairs and its style is shorter than the notch, and the seeds ($1\frac{1}{2}$ mm. long) are 4–5 in each cell. In *V. polita* the calyx-lobes are ovate, acute and practically glabrous, the capsule is glandular-hairy with the style considerably longer than the notch, and the cells contain 4–10 seeds (about 1 mm. long).

The corolla of *V. opaca* is pale blue in colour, which would at once distinguish it from *V. polita* with its rich dark blue flowers, whilst its capsule, bearing no glandular hairs, clearly separates it from *V. agrestis*.

The distribution of *V. opaca* on the Continent includes Norway Sweden, Denmark, Germany, Holland and Belgium, so it is likely, as Babington pointed out as long ago as 1843, to be discovered in these Islands.

RHINANTHUS HIRSUTUS Lam.

This is widely distributed in Europe, growing in Belgium, almost everywhere in France (including Normandy and Brittany), Germany, etc.

It is closely allied to our native *R. major* Ehrh. var. *apterus* Fries, of which it has the large flowers, elongated appendages to upper lip and general habit. On closer examination, however, the plant will be seen to be more or less pubescent, particularly on the calyx, with differently toothed bracts and other characters.

RUPPIA BRACHYPUS Gay.

This is more closely allied to *R. rostellata* than to *R. spiralis* as it has the shorter non-spiral peduncles and the more gibbous carpels of the former. It may be distinguished from this by the sub-claviform filaments, narrower ovoid anthers and tough woody carpels. In *R. rostellata* the filaments are linguiform, the anthers subglobular and the carpels brittle.

Another character of Gay's plant, and indeed the one to which the trivial name applies, is that of the short pedicels; but this feature is shared by the variety *nana* of *rostellata* which Syme described in Rep. Bot. Exchange Club for 1880, p. 36. This variety is a dwarf rooting plant quite unlike the lax floating delicate *R. brachypus* of Gay.

The presence of this in Scandinavia, Finland, France and Germany makes its occurrence in Britain possible.

HELEOCHARIS MAMILLATUS Lindb. fil.

This seems to hold a middle position between *H. palustris* and *H. uniglumis*, and as it has been noted in many localities in Finland, Norway and Sweden by its discoverer, Harald Lindberg (in 1902), it may perhaps be seen upon the eastern shores of Scotland or in the Orkneys or Shetlands. The habit of the plant appears to be more that of *palustris*, but the colouring is of a light green and not dark as in that species.

The approximate shapes of the ripe fruits of the three species may be thus contrasted:

In *H. palustris* the style-base is longer than broad and more or less gradually tapering; the colour of the whole nut is yellowish in tint.

In *H. mamillatus* the colouring is much the same, but the shape of the style-base is different; it is broader than long with an abruptly contracted apex.

In *H. uniglumis* the nut is brown in colour, and slightly larger than in both the preceding; its style-base is broader than long and much of the *mamillatus* type.

As regards the lowest glume character, both *palustris* and *mamillatus* come under the section where this organ encloses about half the circumference of the spike and never completely encircles it; in *H. uniglumis* it normally entirely surrounds the spike or occasionally three-parts encircles it.

CAREX FRIGIDA All.

Although from its Continental distribution this is somewhat unlikely to be found in our Islands, being non-Scandinavian and more or less local in its stations in the Alps, Apennines, Vosges, Pyrenees, etc., it seems worthy of mention from the fact that it was reported in 1874 as having been discovered by John Sadler during the excursion of the Scottish Botanical Alpine Club to the Aberdeen and Forfarshire mountains.

The plant remained in our lists until the Rev. E. F. Linton, in an interesting article in this Journal for 1898 (p. 41), conclusively showed that Sadler's plant was much more closely allied to *C. binervis* than to *C. frigida*; he gave it the name *C. Sadleri*, saying however that "*C. binervis* Sm. var. *Sadleri* would perhaps be better."

The stoloniferous root, the lanceolate male-glumes and the scabrid beak of the perigynia of *C. frigida* separate it from *C. binervis* and all its varieties.

CAREX LÆVIROSTRIS Fries.

This plant, which is also called *C. rhyncophysa* C. A. Meyer, has a somewhat restricted distribution in Europe, but as that includes Lapland (Russian and Swedish), Finland, Northern and Southern Norway and Sweden, it may possibly occur in northern or eastern Scotland.

C. rostrata is its nearest British ally and indeed *C. lævirostris* might be easily passed over as a broad-leaved form of this.

The larger number of male spikes, the longer-beaked fruit, the triquetrous stem and the broad, flat, spreading leaves, etc., are all very obvious points that keep the last-named plant abundantly distinct.

In 1893 it was reported in this Journal (p. 33) that *C. rhyncophysa* had been discovered in Ireland and a figure was there given of the Irish plant. The description and figure given did not seem conclusive evidence that the true plant had been found and in 1899 Mr. Druce read a paper before the Linnean Society (Journ. Linn. Soc. 276, 1899) in which he maintained, after having seen the Irish plant growing, that it was not true *lævirostris* but rather *C. rostrata* var. *latifolia* Ascherson. I understand that Mr. Arthur Bennett considers the Irish plant nearer the American *Carex* named *C. rostrata* With. var. *utriculata* Bailey, which occurs in bogs right across the Continent north of Ohio. This is the *C. utriculata* of Boott, figured in his *Illustrations of Carex*, i. t. 39.

ALABASTRA DIVERSA.—Part XXVII.*

By Spencer Le M. Moore, B.Sc., F.L.S.

(Plate 547.)

1. Bellida *Ewart.*

The smaller of the two plants on the plate was figured and described by Prof. Ewart in Proc. Roy. Soc. Vict. N.S. xix. 34, t. x. (1907). Certain of its characters suggested to him an affinity with *Helichryseæ*; but the cone-tipped flattened style-arms and apparent absence of tails to the anthers naturally seemed to indicate the proper place of the genus to be among the *Asteroideæ*, where it has remained hitherto without challenge. The discovery, however, in the interior of Western Australia of a second and larger species (fig. 1) and its detailed examination have led me to the conviction that the genus should be arranged among the *Helichryseæ*. The reason for this will be given in the appended description.

Bellida major, sp. nov. Planta spithamea vel paullo ultra; *caule* ascendente simplici vel prope basin rariramoso sparsim substrigillose puberulo; *foliis* caulis basin versus insertis sessilibus linearibus nisi lineari-spathulatis obtusis puberulis; *capitulis* solitariis longipedunculatis ∞-flosculosis flosculis intimis imminutis sterilibus; *involucri* 3-serialis phyllis lanceolatis obtusis piloso-puberulis tenuiter scariosis exterioribus intermediisque inappendiculatis intimis oblongis lamina papyracea radiante oblonga obtusa dilute punicea vel fere omnino alba onustis; *receptaculo* plano; *corollæ* tubulosæ lobis 5 triangularibus obtusis; *antheris* basi microscopice caudatis; *styli* ramis complanatis flosculorum sterilium abbreviatis; *achæniis* elongatis anguste fusiformibus sursum in rostrum brevem contractis haud rugatis pubescentibus puberulisve; *pappi* setis numerosis breviter plumosis roseis.

Western Australia, Mulline; *J. E. C. Maryon*, 1916.

Folia pleraque 5–7 cm. long, summum 2–4 mm. lat. Pedunculus circiter 20 cm. alt., pilis brevibus substrigillosis munitus. Capitula pansa 2·5 × 3 cm. Involucri phylla exteriora dilutissime brunnea, 5–7 mm. long., intima appendice exempta 10 mm. long., appendix 14 × fere 4 mm. Corollæ 4 mm. long. Achænia 11 mm. long. (rostro 4 mm. long. incluso). Pappi setæ 6–7 mm. long.

Comparison of the above with Ewart's description of *B. graminea* shows that the involucre of the new species differs from that of the old in the presence of a prominent radiating lamina to the innermost of its leaves. This character suggests affinity with *Helichrysum* and allied genera, affinity which the tailless anthers would seem to deny. This contradiction pointed to the advisability of examining the anthers under the compound microscope, with the result that undoubted slender tails were revealed, although their close apposition to the filament made this a matter of some difficulty (fig. 7); moreover, as shown in fig. 17, the anthers of *B. graminea*, similarly scrutinized, were also seen to be provided with tails. Remain therefore only the

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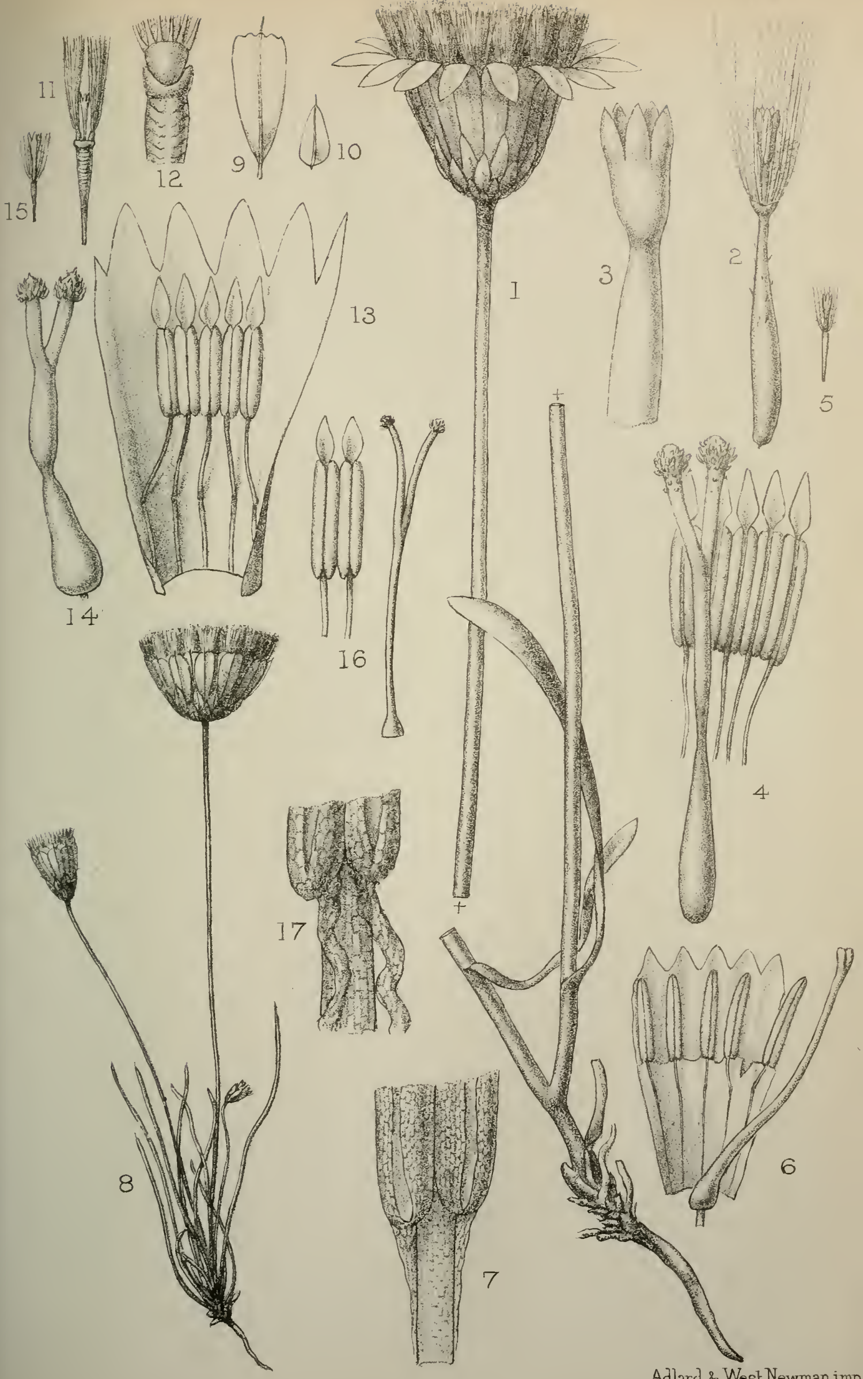
* The types of the plants described in this paper are in the National Herbarium.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P. Highley, del. et lith.

Adlard & West Newman, imp.

1-7. Bellida major *S. Moore*

style-arms already mentioned as asteroideous in nature. Certain *Helichrysæ*, however, have style-arms not markedly dissimilar, and those of the genus *Schœnia* are virtually identical. It is next to this genus that it would seem fitting to place *Bellida.*

The inner florets of *B. major* are certainly sterile with the style-arms correspondingly reduced (figs. 5 & 6). This is apparently the case with the small florets of *B. graminea* also, although their style-arms remain of a fair size (figs. 15 & 16). This character, it should be noted, *Bellida* shares with *Schœnia.*

It may also be mentioned that the difference between the two species in the shape of the achenes—stalked (*B. graminea*), rostrate (*B. major*)—is remarkable in a group where this character may be of generic value; but the points of resemblance are too numerous to make this a reason for generic separation. As regards further the fruit, besides the elegant sculpturing on the achenes of *B. graminea*, entirely absent from those of *B. major*, the almost free pappus-hairs of *B. major* should be compared with those of the other species, curiously enough, as Ewart has shown, united into two phalanges by two broad basal membranes (figs. 2 & 12).

It follows from the above that the generic character requires some slight modification and may be stated briefly thus :—

BELLIDA Ewart (*l. c.*). Genus *Schœniæ* Steetz proxima abs qua certe distat ob capitula solitaria, antherarum loculos basi rotundatos microscopice tenuissime caudatos, flosculorum sterilium styli ramos breves vel elongatos, achænia elongata stipitata vel rostrata.

A clavis of the species is unnecessary, as the differential points can easily be seen from the figures. It only remains to mention that the prominent rose-coloured pappus hoisted upon the long achenes gives these plants a very striking appearance.

EXPLANATION OF PLATE 547.

1. *Bellida major*; plant nat. size. 2. A perfect floret × 2. 3. Corolla of same × 8. 4. Andrœcium and style-arms × 15. 5. Sterile floret × 2. 6. The same, opened corolla, andrœcium, etc. × 15. 7. Base of anther of perfect floret, showing microscopic tails closely apposed to the filament × 60. 8. *Bellida graminea*; plant nat. size. 9, 10. Involucral leaves of same × 2. 11. Perfect floret × 2. 12. Top of achene in side view, showing setæ of pappus coalesced below × 8. 13. Perfect floret, corolla opened × 15. 14. Style and style-arms of same × 15. 15. Sterile floret × 12. 16. Two anthers and style of same × 15. 17. Base of anther of a perfect floret, showing microscopic tails × 60.

2. PLANTÆ ROGERSIANÆ.—II. COMPOSITÆ.

In this Journal for 1913 (li. 183–199) will be found descriptions of African plants, chiefly Rhodesian and Congolese, from the herbarium of Archdeacon Rogers of Johannesburg. Further collections from the same source have since then come to hand containing, as in former ones, a considerable percentage of novelties. Descriptions of some of these are hereby appended. It should be mentioned that in most cases the Archdeacon was himself the collector; where otherwise, the information is given in the ordinary way.

Ethulia pubescens, sp. nov. *Caule* ascendente angulato ramoso uti rami pubescente; *foliis* sessilibus alternis raro oppositis lineari-

oblongis obtusis supra pubescentibus subtus albo-tomentosis; *capitulis* 14-flosculosis in corymbos laxos ramulos terminantes ordinatis pedunculis propriis sæpius involucro brevioribus insidentibus; *involucri* campanulati pubescentis phyllis 4-serialibus oblongo-ovatis acutis interioribus quam exteriora majoribus; *flosculis* exsertis; *achæniis* turbinatis apice truncatis 4-costatis appresse setosis.

Belgian Congo, Elisabethville; n. 10965.

Tota planta nobis obvia 15 cm. alt. Rami ramulique graciles. Folia pleraque 6–12 × 1–3 mm., summa vero imminuta et bracteas mentientia. Corymbi ± 4 × 3 cm.; horum rami gracillimi. Pedunculi proprii plerumque ± 3 mm. long. Capitula pansa 6 × 4 mm. Involucri phylla ext. 2–vix 3 mm. long., int. 4 mm., hæc anguste purpureo-marginatæ. Corollæ purpureæ; tubo anguste infundibulari, 3 mm. long.; lobi anguste triangulares, 2 mm. long. Styli rami 1 mm. long. Achænia 1·25 mm. long., ima basi attenuata.

A curious little plant apparently referable to this small genus and very distinct in it.

Paurolepis, *Compositarum* e tribu *Vernoniearum* genus novum. *Capitula* homogama, tubuliflora. *Involucrum* campanulatum e phyllis paucis subbiseriatis comparate latis coriaceis compositum. *Receptaculum* planum, alveolatum. *Corollæ* tubus infundibularis; limbus 5-fidus lobis angustis. *Antheræ* basi prominenter auriculatæ auriculis connatis. *Styli* rami elongati, hirtelli. *Achænia* collo basilari parvo imposita, apice truncata, 4-costata. *Pappi* squamæ circa 20, duplicie serie insertæ, laceratæ; setæ 0.—Suffrutex tenuis. Folia alterna, angusta, integra. Capitula parva, ad apicem ramulorum laxe corymbosa. Flosculi purpurei.

P. angusta, sp. unica. *Ramulis* tenuibus subtiliter striatis minute puberulis tandem fere glabris; *foliis* sessilibus anguste linearibus ob margines arcte revolutas subteretibus microscopice sericeis; *corymbis* quam folia plane longioribus; *capitulis* 10-flosculosis; *involucri* phyllis ovatis vel ovato-oblongis acutis minute sericeis; *flosculis* longe exsertis; *corollæ* extus pubescentis necnon pellucido-glandulosæ tubo quam lobi anguste oblongi obtusiusculi paullulum breviore; *styli* ramis exsertis; *achæniis* turbinatis appresse setosis; *pappi* squamis achæniis multo brevioribus lanceolatis sordide albis.

N. Rhodesia, Broken Hill; n. 7738. [Also at Kew from Bowood Siding; n. 8057.]

Planta saltem bispithamea. Folia pleraque 1–3 cm. long., circa ·5 mm. lat. Corymbi 5–7 × 6–8 cm. Pedunculi proprii filiformes, 2–4 cm. long. Capitula pansa 1 cm. lat. Involucrum 3 mm. long. Corollæ tubus 3·5 mm. long., ima basi ·75 mm. sub faucibus 2 mm. lat.; lobi 4 mm. long., ·8 mm. lat. Antheræ 3 mm. long. Styli rami longit. 3 mm. paullulum excedentes. Achænia fere 2 mm. long. Pappi squamæ ·5 mm. long.

The genus finds its warrant in the curious pappus; the subbiseriate coriaceous involucre is also worthy of notice. The affinity is with *Herderia*, *Triplotaxis* and *Ageratina*.

Vernonia (§ *Lepidella*) **zambesiaca**, sp. nov. Verisimi ter suffrutex, *caule* erecto sursum ramoso folioso subtereti eximie pluristriato minute pubescente; *foliis* sessilibus linearibus rarius anguste lineari-oblongis apice mucronulatis utrobique scabriusculis; *capitulis* mediocribus fere 50-flosculosis corymbos laxos 3–5-cephalos ramulos terminantes efformantibus pedunculis propriis sat elongatis fultis; *involucri* minute pubescentis phyllis 5–6-serialibus oblongis interioribus gradatim longioribus; *receptaculo* convexiusculo foveolato; *flosculis* breviter exsertis; *achæniis* subcylindricis (basi paullulum coartatis) callo basilari prominente præditis 12-costatis griseo-setosis; *pappi* squamis lineari-lanceolatis acutis setis ultra 20 achæniis circiter æquilongis dilute brunneis.

North bank of Zambesi at Mazabuka; n. 8744.

Planta saltem bispithamea. Folia longit. 5 cm. attingentia sed sæpius minora (± 2·5 cm. long.), 2–5 mm. lat. Corymbi 5–10 × 4–7 cm.; horum bracteæ ± 5 mm. long., lineares. Pedunculi proprii plerumque 2–5 cm. long. Capitula pansa circa 1 × 1 cm. Involucri phylla exteriora 2–4 mm., intermedia 5 mm., intima 7 mm. long. Corollæ purpureæ; tubus subcylindricus (superne leviter ampliatus), extus microscopice puberulus, 4·5 mm. long., quam lobi oblongi longior. Styli rami 2 mm. long. Achænia 3–3·5 mm. long. Pappi squamæ ·75 mm., setæ 3·5–4 mm. long.

Near *V. jugalis* O. & H., but different in several respects.

Vernonia (§ *Lepidella*) **amœna**, sp. nov. *Caule* sat valido erecto ramoso subtereti optime striato uti ramuli erecto-ascendentes multo minores validi foliosique minute pubescente; *foliis* oblongo-oblanceolatis vel lanceolato-oblongis apice mucronulatis basi in petiolum brevem desinentibus membranaceis supra scabriusculis subtus præsertim in nervis pubescentibus deinde glabrescentibus; *capitulis* mediocribus circa 35-flosculosis in corymbos elongatos oligocephalos digestis pedunculis propriis sæpius quam sese multo longioribus fultis; *involucri* campanulati pubescentis phyllis 5-serialibus lanceolatis acuminatis viridibus interioribus gradatim longioribus; *corollis* breviter exsertis; *achæniis* subcylindricis (inferne paullo angustatis) callo basilari perspicuo insertis 8-costatis inter costas appresse setulosis; *pappi* squamis pluribus linearibus acutis uti setæ ultra 23 multo longiores scabriusculis albis.

South Rhodesia, Wankie; n. 13300.

Folia usque ad 8 × 3 cm., plerumque vero minora, e. g. 4 × fere 2 cm., superiora imminuta nec summa in bracteas non transeuntes, pag. inf. glandulis immersis paucisque aliis superficialibus lucentibus prædita, in sicco viridia; petioli 5–10 mm. long. Corymbi ± 12 × 8 cm.; pedunculi proprii 2–5 cm. long.; bracteæ ulteriores lineares, ± 5 mm. long. Capitula pansa 1·5 × 1·2 cm. Involucri phylla extima 3–5 mm. long., intermedia circa 8–10 mm., intima 13 mm. long., omnia glandulis lucentibus pilis intermixtis gaudientia. Corolla verisimiliter alba; tubus angustus, sub limbo ampliatus, extus pubescens, 8 mm. long. Styli rami puberuli, vix 3 mm. long. Achænia 4 mm. long. Pappi squamæ 1 mm. long.; setæ 6 mm.

At first sight this might be mistaken for *V. chloropappa* Baker, but the heads and involucral leaves of the new plant are somewhat the larger and broader, the achenes also are longer and broader and the scales of the pappus longer. Moreover the setæ of the pappus, white instead of green, are much more numerous.

Felicia Rogersii, sp. nov. Fruticulus, *caule* ut rami lignoso cinereo ramulos foliosos steriles perbreves necnon longiores capituliferos pubescentes deinde glabrescentes gignente; *foliis* ramulorum perbrevium fasciculatis ramulorum longiorum sparsis omnibus sessilibus linearibus obtusis basi nonnunquam aliquantulum ampliatis hispidulis; *capitulis* pro rata majusculis solitariis pedunculatis ∞-flosculosis; *involucri* 4-serialis phyllis lanceolatis obtusiusculis margine scariosis necnon plus minus purpureis dorso hispidulis; *ligulis* 13 cœruleis uti disci corollæ bene exsertis; *achæniis* anguste oblongis obscure costatis microscopice puberulis; *pappi* setis elongatis levibus dilute stramineis.

Cape, Worcester Division, Orchard Siding, alt. 1400 ft.; n. 16427.

Verisimiliter planta circiter spithamea. Folia pleraque 5–8 mm. longa, in sicco viridia. Pedunculi ± 2 cm. long., bracteis perpaucis circa 3 mm. long. præditi. Capitula pansa 2 cm. diam. vel paullo ultra. Involucri phylla extima 4 mm. long., intermedia 5 mm. intima 6·5 mm. Ligulæ oblongæ, apice integræ rotundatæque. Corollæ disci 5 mm. long. Achænia cruda ægre 2·5 mm. long. Pappus 8 mm. long.

The fasciculate leaves on the reduced branches together with the comparatively large heads with their 4-rowed involucre are the chief points about this species.

Felicia venusta, sp. nov. Planta semispithamea vel paullo ultra, *caule* lignoso basi nudo mox ramulos rigidos erectos copiose foliosos emittente; *foliis* sessilibus imbricatis ramoque appressis anguste linearibus apice mucronulatis margine ciliolatis dorso carinulatis microscopiceque puberulis; *capitulis* mediocribus ∞-flosculosis ramulos solitatim terminantibus pedunculis sat elongatis gracilibus puberulis bracteis foliis similibus nisi minoribus onustis necnon ut se ipsi purpureis insidentibus; *involucri* phyllis 3–4-seriatis exterioribus oblongolanceolatis obtuse acutis interioribus oblongis obtusis omnibus margine anguste scariosis ciliatisque ceterum plus minus purpureis; *ligulis* adusque 13, exsertis, vivide cœruleis; *corollæ* disci ex involucro vix eminentibus; *achæniis* (minime maturis) oblongis compressis obscure costatis glabris; *pappi* setis breviter barbellatis albis.

Cape, Worcester Division, Orchard Siding; n. 16565.

Folia pleraque 5–7 mm. long., nec ultra 1 mm. lat., in sicco læte viridia, superiora imminuta in bracteas transeuntia. Pedunculi 3–4 cm. long.; horum bracteæ 2–3 mm. long. Capitula pansa 6 mm. diam. Involucri phylla extima 3 mm., intermedia 5 mm., intima 7 mm. long. Ligulæ oblongæ, apice rotundatæ obscureque denticulatæ, 6 mm. long. Corollæ disci infundibulares, 4 mm. long. Achænia ægre 2·5 mm., pappus 4 mm. long.

This must be near *F. imbricata* DC., which is described as having larger and broader leaves and linear outer involucral leaves hairy on the back while the inner ones are glabrous and scarious.

Nolletia rhodesiana, sp. nov. Fruticulus; *caule* lignoso tenero glabro inferne nudo superne sparsim folioso pro rata pluriramulosoque; *ramulis* teneris puberulis; *foliis* sessilibus linearibus acutis margine microscopice denticulatis membranaceis puberulis; *capitulis* heterogamis ∞-flosculosis flosculis paucis extimis ♀ ceteris ⚥; *involucri* late campanulati phyllis 3-serialibus lanceolatis acutis margine membranaceis necnon microscopice ciliolatis aliter fere glabris; *receptaculo* convexiusculo; *corollis* fll. ♀ inclusis linearibus apice bifidis quam stylus plane brevioribus; *corollis* fll. ⚥ breviter exsertis infundibularibus; *stylo* fll. ⚥ subincluso ramis appendicibus lanceolatis onustis; *achæniis* fll. ♀ subcylindricis fll. ⚥ compressis anguste-obovoideis omnibus microscopice hispidulis; *pappi* setis caducis scabriusculis albis.

Victoria Falls; n. 13299.

Planta verisimiliter circa bispithamea. Folia summum 3·5 cm. long., pleraque vero minora, sc. ± 1·5 cm. long., 1–2 mm. lat. Capitula pansa 7 mm. diam. Involucrum 4 mm. long. Corolla fll. ♀ 1 mm. long.; hujus stylus (ramis inclusis) 2 mm. long. Corolla fll. ⚥ flava, 3 mm. long. Antheræ 1·5 mm. long. Styli rami (inclusa appendice ·2 mm.) ægre 1 mm. long. Achænia 1·5 mm. long.; fll. ♀ ·3 mm. lat., fll. ⚥ ·75 mm. lat. Pappus 3 mm. long.

Very like the S.W. African *N. araneosa* O. Hoffm.; differing from it in the more frequent branching of the new species in its upper parts, which gives a corymbose look to the inflorescence; the nearly glabrous foliage and involucres; the glabrous (not pilose) corollas of which the ♀ have a bifid and not an entire limb, and the larger, broader, more markedly hispidulous achenes.

Nestlera consimilis, sp. nov. Fruticulus ramosus; *ramis* tenuibus crebro foliatis mox glabris; *foliis* sessilibus linearibus obtusis margine arcte revolutis supra glanduloso-viscidis subtus albo-tomentosis; *capitulis* pro rata parvis terminalibus solitariis sessilibus ∞-flosculosis; *involucri* campanulati phyllis 6-serialibus exterioribus ovatis interioribus oblongis (intimis anguste oblongis) omnibus appendice late rotundata phyllorum interiorum suborbiculari scariosa onustis; *receptaculo* alveolato alveolis fimbriatis; *ligulis* numerosis breviter exsertis oblongis apice minutissime denticulatis; *corollis* disci inclusis superne leviter ampliatis; *achæniis* (immaturis) radii ovoideis setosis disci anguste cylindricis glabris; *pappi* squamis inter se liberis ovatis laceratis.

Cape, Worcester Division, Pieter Meintjis, alt. 3585 ft.; n. 16367.

Folia ± 10 mm. long., 1–1·5 mm. lat., in sicco olivaceo-fusca. Capitula pansa circa 8 mm. diam. Involucri phylla extima 2–2·5 mm., intermedia 4·5–5 mm., intima 5·5 mm. long. Ligulæ fere 5 mm. long. Corollæ disci 3 mm. long. Antheræ 2 mm. long. Achænia vix 1 mm. long.; pappi squamæ albæ, ·5 mm. long.

General appearance much that of *Relhania paleacea* L'Hérit. (*L. ericoides* Cass.). Very close to *N. relhanioides* Schlechter with which it can scarcely be conspecific on account of the flatter (less revolute) leaves, the broader ends to the innermost leaves of the involucre, and the well-marked receptacular fimbriæ which are absent apparently from the receptacle of *N. relhanioides.*

Anaglypha latifolia, sp. nov. *Caule* erecto verisimiliter simplici gracili crebro folioso pubescente; *foliis* laxe imbricatis inferioribus ovatis superioribus oblongis vel oblongo-lanceolatis omnibus mucronulatis his plerumque sessilibus vel fere sessilibus basi cordatis leviter amplexicaulibus illis breviter petiolatis basi truncatis margine integris denticulatisve raro dentatis omnibus utrobique scabriusculis; *capitulis* solitariis pedunculis paucibracteatis pubescentibus folia facile excedentibus insidentibus; *involucri* subhemisphærici phyllis 3-serialibus lineari-lanceolatis acutis dorso puberulis; *ligulis* pluribus exsertis oblongis 3-dentatis luteis; *achæniis* adhuc valde crudis oblongis compressis nitidis sparsim papillosis calvis.

Transvaal, Lydenburg, Pilgrim's Rest and Sabie; nn. 14319, 18670.

Planta verisimiliter 1–2-spithamea. Folia inferiora ± 12 × 6 mm., superiora pleraque 12–15 × 4–7 mm., in sicco viridia vel brunnescentia; petioli dum adsint summum 3 mm. long. Pedunculus 3–7 cm. long.; hujus bracteæ sparsæ lineares vel lineari-lanceolatæ, ± 6 mm. long. Capitula pansa circa 15 mm. diam. Involucrum 5·5 × 7 mm.; hujus phylla 4–5 mm. long. Ligulæ 5 mm. long. Achænia 1 mm. long.

Has all the floral characters of the plant figured in Hook. Ic. Plant. t. 1109 and so belongs to a very small and little known genus. In foliage it is very distinct.

Pentatrichia alata, sp. nov. Planta spithamea vel minus, *caule* subsimplici ascendente crebro folioso uti folia glanduloso-hirtulo, *foliis* ovatis inciso-lobatis (lobis dentatis obtusis) petiolis sat late alatis insidentibus membranaceis, *capitulis* paucis heterogamis (flosculis circiter 12 extimis ligulatis ♀ ceteris numerosis ⚥) terminalibus vel ramulos breves ex caule juxta apicem oriundos terminantibus pedunculatis pedunculis bracteis pluribus parvis onustis; *involucri* campanulati phyllis pluriseriatis interioribus gradatim longioribus anguste lineari-lanceolatis acuminatis dorso glanduloso-pubescentibus, *corollis* breviter exsertis, *antheris* basi longiuscule caudatis, *styli* ramis linearibus obtusis, *achæniis* adhuc crudis cylindricis glabris pappi setis 5 tenuissimis onustis.

Transvaal, Pilgrim's Rest; n. 18667.

Folia pleraque 2–3 × 1·2–2 cm. petiolo 7–15 mm. long. et 2 mm. lat. exempto, in sicco viridia vel brunnea. Pedunculi circa 1 cm. long.; horum bracteæ lineares, hirtulæ, circa 2 mm. long. Capitula pansa (sicca) 1 × 1·2 cm. Involucri phylla pallida, extima 2–3 mm., intermedia 4–6 mm., intima 7 mm. long. Ligulæ albæ, oblongæ, apice bidenticulatæ, 7·5 mm. long. Flosculorum int. corollæ luteæ, 6·5 mm. long.; harum tubus inferne tenuis superne gradatim ampliatus. Styli rami 1 mm. long. Achænia 1 mm., pappi setæ 5 mm. long.

The plant upon which Klatt founded this genus is a native of South-West Africa; by the discovery, therefore, of a Transvaal species the distribution of *Pentatrichia* receives a notable extension. The new plant can immediately be recognized by its winged petioles and radiate heads. This latter character necessitates a slight modification in the generic description.

The outer pappus of *P. alata* consists of very minute scales almost invisible except under the compound microscope.

(To be concluded.)

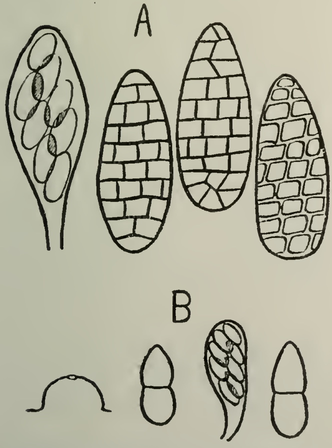
NEW RARE OR CRITICAL LICHENS.

By W. Watson, B.Sc.

The possibility of obtaining dyes from lichens has aroused a greater interest in these plants than has been shown for many years, and the difficulty of obtaining sufficient dyes by other methods may render the process of obtaining dyes from lichens economically possible. The "crottle" and the "lit-pig," the adjuncts to this home-industry of the crofters, have never been entirely abandoned in the Scottish Highlands, and may again come into favour. Considering the increase of interest in these plants and the slight amount of attention paid to them in recent years, there need be no apology for the following notes, but an apology may be necessary for the description of new species, since these chiefly depend on microscopic characters and add further species to genera which are already overburdened. No other course, however, seems to be available, unless one is bold enough to "lump" many of the so-called species together, and place the "small species" as varieties. The evidence is not sufficient to warrant this course, and other lichenologists who have seen the specimens consider it advisable to publish them as new. The difficulties of correlation between British and Continental lichenological works are dealt with in some of the notes concerning some of our common species.

The numbers following the localities are those of the vice-counties.

Thelidium terrestre, sp. nov. Thallus tenuis, crustaceo-effusus vel leprosus, viridis vel viridi-nigrescens, hyphis paucis, gonidiis viridibus. Perithecia minuta, nigra, sparsa, semi-immersa tandem emerso-sessilia, dimidiata; tunica externe nigro-brunnea, interne cinereo-brunnea; ostiolo minuto haud depresso; hymenio sine gonidiis; ascis clavatis; paraphysibus hyalinis evanescentibus vel nullis; osteolis filamentis aut paucis aut nullis; gelatina hymenia læte rubra cum iodo; sporis octonis, hyalinis vel albido-cinereis, ellipsoideis, granulis, ab altera parte plerumque angustatioribus, uniseptatis, 0·016–28 mm. longis, 0·007–11 mm. latis, in medio leviter constrictis. Ad terram.



A. *Polyblastia mortensis.* Ascus × 125; three spores × 500.

B. *Thelidium terrestre.* Perithecium × 25; ascus × 125; two spores × 500.

Thallus thin, crustaceo-effuse or leprose, green or darker, with green algal cells (Pleurococcus) and few hyphæ. Perithecia minute, black, scattered, semi-immersed, at length more or less sessile, dimidiate; outer wall dark brown, inner paler-brown; minute ostiole not depressed;

hymenium without algal cells; asci clavate; paraphyses hyaline, disappearing or absent; osteolar filaments few or none; hymenial gelatine bright-red with iodine; spores 8-næ, colourless or greyish, ellipsoidal, granular, one end usually narrower than the other, 1-septate, lightly constricted in the middle, 16–28 × 7–11 μ (fig. B).

On soil of hedge-bank, Cheddon Fitzpaine, South Somerset (5). associated with *Tortula cuneifolia*, *Barbula fallax*, protonema and *Dactylococcus dispar*, March 1915. It is near *T. Zwackii* Hepp, but that occurs on rock and the spores are 1–3 septate. There is no sign of any further septation in *T. terrestre*.

Polyblastia mortensis, sp. nov. Thallus tenuis, crustaceus, minute granulosus, effusus, continuus, vel cinerascens vel cinereovirescens vel fuscescens vel olivaceus interdum nigrescens vel subevanescens, in statu humecto haud gelatineus, gonidiis viridibus. Perithecia parva vel mediocria, semi-immersa, parte tertia superiore emersa, convexa, nitentia; tunica superne crassa et nigra, ad basin tenuis et brunnea; ostiolo leviter depresso; hymenio sine gonidiis; osteoleis filamentis aut paucis aut nullis; ascis subinflate clavatis; paraphysibus mucilagineis aut paucis aut nullis; gelatina hymenia vinosa cum iodo; sporis oblongis, octonis, hyalinis demum cinereobrunneis, muraliformibus cum 7–14 transversalibus ordinibus cellarum parvarum, 0·040–50 mm. longis, 0·016–20 mm. latis.

In cæmento aut in solo summorum murorum, prope mare.

Thallus thin, crustaceous, minutely granulose, effuse, continuous, greyish or greenish-grey or olivaceous, sometimes darker or evanescent, not gelatinous when moist, algal cells green (Protococcus). Perithecia small or moderate, semi-immersed with the upper third emergent, convex, shining; wall black, at the base thin and brown; osteole slightly depressed; hymenium without algal cells; osteolar filaments few or none; asci clavate somewhat inflated; paraphyses few or none, mucilaginous; hymenial gelatine wine-red with iodine; spores oblong 8-næ, colourless, becoming brownish, muralilocular with 7–14 transverse rows of small cells, 40–50 × 16–20 μ (fig. A).

On soil-cap of walls or on mortar, often on decaying mosses such as *Tortula muralis*, near the sea, Morte, N. Devon (4), December, 1913.

This species is near *P. terrestris*, which has smaller spores. *P. gelatinosa* besides other characters has osteolar filaments, which are absent or almost so in this plant. *Verrucaria interfugiens* Nyl. has thinner spores.

Spilonema paradoxum Born. On damp siliceous rocks near Tremadoc (48) and Beddgelert (49). August 1915.

Schizoma lichinodeum Nyl. On ground with *Myurella apiculata*, Ben Eachan, 3200 ft. (88). August 1913.

Collema ceraniscum Nyl. On damp shaded rocks near *Blindia cæspiticia*, 3900 ft., Ben Lawers (88). The locality is given in Crombie's Monograph, but it is worth while recording it as still occurring there in 1913.

C. pulposum (Bernh.) Ach. A form with a well developed thallus forming a rosette occurs at Loxton (6), Quantoxhead (5), etc.

This form corresponds to var. *formosum* (Ach.) Nyl., and appears to be fairly frequent. Crombie (*British Lichens*, p. 45) erroneously gives the reaction with iodine as reddish; on p. 46 he says that *C. tenax* (I+reddish) can be distinguished from *C. pulposum* by the reaction with iodine, thus showing that the reaction given on p. 45 is a mistake. *C. compactum* Ach. is given as a synonym for *C. pulposum* form *compactum* Nyl. by Crombie (*l. c.*). Harmand (Lich. de Fr.) states that the plant of Acharius is *C. tenax*, so that if the British plants really belong to *C. pulposum*, the name *compactum* ought not to be given to them. The variety *pulposulum* Nyl. (= *C. pulposulum* Nyl.) is not *C. pulposulum* (Wedd.) Harm. Nylander's name has priority (1864) to Weddell's (1869), so that the naming in Crombie is correct and the plant given as *C. pulposulum* in Harmand's Lich. de Fr. (p. 84) has no right to that name.

C. tenax and *C. crispum* are united together under the name of *C. tenax* by some continental authors. There appears to be much justification for this course, since the only practical difference appears to be that the apothecial margin is crenulate in *C. crispum*, and entire in *C. tenax*. The thalline characters in plants with entire margins to the apothecia are variable, whilst those of plants with crenulate margins to the apothecia are similarly variable, and on the same plant apothecia may be entire or crenulate. As *Lichen tenax* Sw. (1784) is an older name than *Lichen crispus* Ach. (1798), *C. tenax* should be retained; *C. crispum* may be considered as a form of it. Knowing the difficulties of dealing with species of *Collema*, it is in no spirit of carping criticism that I have derived some amusement from the varying descriptions and synonyms of *C. multiflorum* var. *palmatum* Hepp. According to Crombie (p. 47) this equals *C. tenax* var. *coronatum* Koerb.; according to Harmand (p. 87) it is also equivalent to his var. *palmatum* of *C. tenax*; therefore var. *coronatum* Koerb. and var. *palmatum* Harm. must be the same plant: but the descriptions do not coincide. Harmand also gives *Lichen palmatus* Huds. as a synonym for two entirely different plants—on p. 87 for *C. tenax* var. *palmatum* and on p. 113 for *Leptogium palmatum*, the latter being correct. Crombie (p. 47) adopts a better course in rejecting the varietal name of *palmatum*, since it might be confounded with *L. palmatum*.

C. glaucescens Hoffm. may occur on sandy or calcareous soil. Sandy hedgebank, Dinnington, S. Somerset (5); sand of dune-slack, Braunton, N. Devon (4).

C. aggregatum (Ach.) Nyl. Braunton (4), Staple Fitzpaine (5).

C. chalazanellum Nyl. has not previously been recorded from the British Isles. It is similar to *C. chalazanum* Ach. but the thallus is much smaller, the apothecia are less than 0·2 mm., and the spores are also smaller ($12–19 \times 6–10\,\mu$). It occurs on the thin soil-cap of a limestone wall near Taunton (5).

C. melænum Ach. According to Crombie a wine-red coloration is given by iodine to a thin section of the thallus. Harmand says there is no reaction with iodine. A number of plants tested give no red coloration. The plant is named *C. multifidum* by Schaerer in Enum.

crit. Lich. Europ. (1850), since *Lichen multifidus* Scop. (1792) antedates *L. melænus* Ach. (1798).

Collemopsis lecanopsoides Nyl. On thin soil-cap of calcareous wall, Henlade, near Taunton (5). In this plant the algal constituent is not *Nostoc*, but has been attributed by M. Bornet to the *Scytonemaceæ.* It has been placed under the genus *Porocyphus* as *P. areolatus* (Flot.) Krb.

Collemodium andegavense (Hy.) is very near to *C. turgidum,* but the thallus is less plicated and has the appearance of a small *Collema pulposum.* The hypothecium consists of stratified pseudoparenchyma, the spores are 6–8-næ, often over 30 μ long, thinner at one end and with 4–5 transverse septa with a few longitudinal divisions. So far as I know this has not been recorded from the British Isles, but it occurs on limestone walls near Taunton (5).

C. fluviatile (Huds.) Nyl. On rocks in or near stream, Cray, Wharfedale.

Leptogium pusillum Nyl. In fallow field on earth or stones, Aisholt (5).

Peltigera canina var. *membranacea* Ach. is not uncommon. I have specimens from Luxborough and Exford (5), Harlech (48), Llanberis (49), Mulgrave wood (62, from Mr. Hebden). In the Lich. de Fr. it is placed under *P. canina* f. *leucorrhiza* (Flk.) Harm.

P. rufescens form *prætextata* is a not uncommon form. A similar form also occurs in *P. canina.*

Pannularia nigra. The algal constituent is not *Nostoc*, and the plant is therefore given by some authors as *Placynthium nigrum* Ach. In Somerset the spores are often triseptate, but otherwise the specimens do not agree with the subspecies *P. psotina.*

Calicium melanophæum Ach. (= *Cyphelium melanophæum* Mass.). On trunks of old pines, Quantocks, Somerset (5).

Coniocybe furfuracea form *fulva* Fr. In shady crevice of wall, Killin (88).

Ramalina farinacea form *pendula* Ach. On beech, Exford (5).

R. farinacea form *phalerata* Ach. On pales, Cole (6); on oak-tree, Killin (88).

R. fraxinea var. *ampliata* is not uncommon in Somerset. The form *monophylla* Cromb. is rare, but occurs at Norton Fitzwarren (5).

R. fraxinea var. *calicariformis* Nyl. has the spores of *R. fraxinea,* but the appearance of *R. calicaris.* Corfe (5).

R. pollinaria form *humilis* Ach. On trees and brick walls in Taunton district (5). When it occurs on trees forms intermediate with the type are common, but when on brick walls intermediates are rare, and the plant then appears to be worthy of a higher status than that of a form.

R. breviuscula Nyl. On wall, Woolacombe (4). On rocks near Harlech (48).

R. scopulorum (Retz.) Ach. var. *incrassata* Nyl. On rock, Minehead (5).

R. cuspidata form *minor* Nyl. On rock, Minehead (5).

Usnea articulata (L.) Hoffm. Exton (5), near Gare hill (6), Bradley wood (8).

U. rubiginea (Mich.) Herre. The status of this plant is doubtful; it has been placed as a species, a variety and a form. It appears to be fairly frequent. Exton (5), near Longleat (6), Bradley wood (8), Artro wood (48). Crombie gives a few stations for his form *ferruginascens* of *U. ceratina*, but states that his plant is not *U. florida* form *rubiginea* of Mich.

Cetraria aculeata (Schreb.) Fr. The type is the variety *campestris* Schaer. This has three forms—*edentula* Ach. with few or no spinulose teeth or setæ, *acanthella* Ach. with abundant setæ, and *subnigrescens* Harm. which is somewhat intermediate. All these forms are found on the Blackdowns in Somerset (5). Variety *muricata* Schaer. is practically the same as form *hispida* Cromb. and is the common form of the Pennines and many other upland moors. Variety *alpina* Schaer. is often included in form *hispida* Cromb. It occurs in the Snowdon district (49), and forms similar close cushions to those of the commoner state of *hispida*, but has a more flattened thallus.

Platysma glaucum var. *tenuisectum* Cromb. Near Ilkley (64).

(To be continued.)

BIBLIOGRAPHICAL NOTES.

LXVIII.—"The Gardeners' Chronicle."

On turning up a reference in the index of the first volume of *The Gardeners' Chronicle* I was surprised to find that the page indicated was not in the copy in the Department of Botany. Further investigation showed that from this copy of the *Chronicle* the first eight numbers as originally published are altogether absent, their place being supplied by what are erroneously described as "reprints," in which only the pages containing what was presumably considered to be the more important matter were included. These were reimposed but not reset: the numbers of the pages remain unaltered, only the heading of the first page of each "reprint" having been changed. The headings run:

"Nos. 1–2. Saturday, January 2–9, 1841. Reprinted February 26, 1841" [pp. [1]–9, 19–25].

"Nos. 3–4. Saturday, January 16–23, 1841. Reprinted, April 2" [pp. [33]–41, 51–57].

"Nos. 5–6. Saturday, Jan. 30–Feb. 6, 1841. Reprinted, May 28, 1841" [pp. [65]–73, 83–89].

"Nos. 7–8. Saturday, February 13–20, 1841. Reprinted September 3, 1841" [pp. [97]–105, 115–121].

Owing to the plan indicated, the references in the index apply accurately to the matter on these pages: it is only when one has occasion to look up something on one of the missing pages that the incompleteness of the numbers is detected.

The subject is not of any importance, but seems of sufficient interest to place on record; it is not, I think, generally known, and even escaped the attention of Mr. B. B. Woodward when compiling his invaluable Catalogue of the books in the Natural History Museum.

JAMES BRITTEN.

SHORT NOTES.

CALAMINTHA NEBRODENSIS Kern. & Strobl. Mr. Druce is mistaken in suggesting (p. 55) that his specimen of this plant is new to Greece. Its presence in the Peloponnesus is recognized by Halacsy, Fl. Gr. ii. p. 544, quoting Orphanides exsicc. no. 283, an example of which was before me when I determined Mr. Druce's plant as *nebrodensis*. In this connexion it may be noticed that Halacsy's interpretation of *C.* "*patavina*" is different from that of Boissier or of Briquet. I have not seen specimens from the localities that he quotes on p. 545, but one in Herb. Brit. Mus. determined by him as "*patavina*" is the plant so ubiquitous in Southern Italy which I have named *C. pseudacinos* (in Bull. Ort. Bot. Nap. iii. p. 301, 1911). It is the *Clinopodium minus Pulegii odore Romanum* of Boccone; Mus. p. 50 & Tab. 45 f. A. C. C. LACAITA.

THE USES OF BRACKEN. Sir James Crichton Browne contributes to the *Observer* for March 4 a letter from which the following is an extract: "Knowing that the bracken contains potash, it occurred to me two years ago that it might help us, in some degree, in the dearth of that fertiliser so essential to the cultivation of potatoes and sugar-beet, from which we have suffered during the war, and I communicated with Professor Bayley Balfour of Edinburgh, from whom I learned that in the month of June the fronds and stems hold as much as 20 per cent. of potash, but that in August that amount is reduced to 5 per cent., a large proportion having been given back to the rhizome or soil. I then wrote to Mr. Acland at the Board of Agriculture, suggesting that some experiments should be tried to determine whether the cutting and incineration of bracken in June with a view to obtaining its potash content would be economically feasible, seeing that the process would at the same time restrict the ravages of an aggressive pest. Mr. Acland promised that the proposed experiments should be undertaken, but I have not yet heard the result. Until I read Dr. Shipley's statement I was not aware that starch from the underground stem of the bracken was used as food, but I have long known that the young shoots were regarded as a delicacy in Japan. Mr. K. Kishi, of the Japanese Embassy, kindly told me some time ago how the shoots are there prepared for cooking. 'What you have to do first,' he said, 'is to pick the tender parts of bracken shoots and wash them carefully in fresh water. You then put them into boiling water for two minutes or so, and afterwards remove them to cold water, where they are left for a couple of hours. This is the end of preparation, and you may then use them for cooking in any way you like.' During last summer I got from Scotland parcels of young bracken shoots which were prepared in the manner directed by Mr Kishi, and afterwards cooked as a *purée*, like spinach, and like asparagus heads, being served with melted butter. They proved flavourless and insipid, but not indigestible, and I can understand that in the absence of all other fresh vegetables they might prove useful."

CAREX PSEUDO-PARADOXA S. Gibson. In this Journal for 1916 (p. 14) Mr. C. E. Salmon revives the controversy that existed in 1842–44 respecting this plant, when it was decided by every botanist who took part in the discussion, except Gibson himself, that it was synonymous with *C. teretiuscula* Good var. *Ehrhartiana* Hoppe: the somewhat acrimonious correspondence concerning the plant is to be found in the *Phytologist* of that date. Seaman's Moss, the locality whence came the specimens of the plant in dispute, was a very small piece of boggy land by the side of the Bridgwater Canal about a mile to the west of Altrincham, Cheshire. In this were four pits, round the edges of which was found in considerable quantity *Carex teretiuscula* and the var. *Ehrhartiana*, and in deeper water small tufts of *C. paniculata*, very inferior to those frequently found in Cheshire Meres and therefore not generally gathered for specimens. I lived little more than a mile from the spot and my recollection of it dates from 1857 to 1871, during which period, in company with my friend and neighbour George E. Hunt, we very frequently collected specimens there. Hunt gathered the "beautiful range of specimens of the *teretiuscula-Ehrhartiana* series" referred to in Lord de Tabley's *Flora of Cheshire* (p. 321) and I assisted at very many of his visits for this purpose. Mr. Salmon suggests that Gibson found and described a different plant from that discussed by the other botanists. I submit that it is incredible that so observant and critical a botanist as Hunt could have failed to notice such a plant among the hundreds of specimens he gathered and critically examined, while Gibson found nothing else in the one visit he was said to have made to the locality—if indeed even the one visit was ever made, which I doubt. I do not forget that I deal with the date 1857–1871 and that the date of the controversy was 1842–44, but one can hardly suppose that *C. pseudo-paradoxa* entirely disappeared while *C. teretiuscula* survived. Richard Buxton (1786–1865), author of the *Botanical Guide to Manchester* (1849), told me that he thought Gibson never collected specimens at Seaman's Moss to which place he guided all the other disputants; whether Gibson went there or not, specimens were collected by Dr. J. B. Wood of Manchester on 1 July, 1843, and sent to him, and these he named *C. pseudo-paradoxa*. I possess one sheet of such specimens, which appear to me to be *C. teretiuscula* var. *Ehrhartiana*. I have submitted it to Mr. Salmon, who determines them to be *C. teretiuscula*—the identical specimens that Gibson affirmed to be his *pseudo-paradoxa*! I should be glad to know where G. E. Hunt's herbarium is located—his mosses went to Kew, but I believe the rest were given to some County Natural History Museum. In it are specimens of *C. paniculata* from Seaman's Moss Pits which I should like to see.—SPENCER H. BICKHAM.

REVIEWS.

A Manual of Elementary Botany for India. By RAI BAHADUR K. RANGA ACHARI, M.A., Government Lecturing Botanist, Agricultural College, Coimbatore, formerly Lecturer in Botany, Presidency College, Madras. Madras Government Press, pp. xv, 369. Price 2 rupees (3 shillings). 1916.

THIS seems to us a thoroughly good piece of work. It is now forty-eight years since the late Professor Daniel Oliver's *First Book of Indian Botany* appeared—a remarkable performance for one who had never been in India—intended mainly for English residents in that empire. Our methods of teaching have been revolutionized since 1869: English has become the teaching language for natives of India, and it is for them for the most part that the present book seems to be intended. It is restricted to flowering plants, and this has led the author into some of his too wide generalizations, such as the statement (p. 11) that "All plants begin their life as seedlings, which arise from seeds." Starting with *Tribulus terrestris* and *Gynandropsis pentaphylla*—types of Orders so unfamiliar to British botanists as the *Zygophyllaceæ* and *Capparidaceæ*, but admirably adapted for his purpose—the author, as might be expected, deals much more in detail with matters of histology and physiology than did his predecessor half a century ago. His work "is intended to meet the requirements of students of Secondary and Training schools, Technical and Professional Colleges"; so that the necessity of insisting on the "use of a microscope for purposes of demonstration" does not speak well for the educational methods in vogue in India. So, too, what little reference there is to experimental work in physiology reads all too much like mere demonstration by the teacher, as if the heuristic method were neglected.

The author—wisely, as we think, in an elementary work—intercalates his chapters on such physiological matters as germination, respiration, nutrition, growth, movement, fertilization and seed-dispersal between those dealing with anatomy of the seed, root, shoot, leaf, flower, and seed; and it is refreshing to find these subjects illustrated by unhackneyed Indian examples. In spite of the sentence we have quoted, there is an excellent chapter on vegetative multiplication, followed by one on the principles of classification in which we have noted a few examples of slightly defective English and logic. It begins by the statement that the group of the spermatophyta "includes a very large number of *individuals* (about 120,000 now)," where obviously "species" is meant; and goes on to say that, "it is obvious that plants which are alike in several characters should have had a common origin." This might mislead the student into misunderstanding the facts of adaptive convergence. Judging from the works of our caricaturists, the late Sir William Harcourt and Mr. Henry Chaplin were "alike in several characters"; but we imagine that their common origin was somewhat remote.

The concluding third of the book is devoted to a description of forty principal Indian natural orders, as against a hundred and sixteen dealt with by Professor Oliver; but here again the change in our methods is marked. The single type and the floral schedule have given place to several types and fuller structural detail under each Order, though the classification according to Bentham and Hooker remains. It is somewhat remarkable that a professor in an agricultural college studiously omits the least mention of any economic uses of the plants of which he writes. A brief chapter on ecology, a carefully drawn up glossary, and a Latin index of the plants mentioned, with their Tamil and Telugu names, concludes the work. We hope that in the next edition the Urdu names may at least be added, so that the use of so excellent a manual in Northern India may be facilitated.

Among minor matters we notice that the author evidently uses the term "saccate" in a different sense from that usual with us, since he terms the distinctly calcarate flower of *Eulophia* "slightly saccate"; and, in the face of all recent work on the seeds of *Orchidaceæ*, his statement that all Monocotyledons are endospermic is assuredly too sweeping.

The 356 text-figures have all been specially drawn for the work, and this well-printed well-bound volume is produced for three shillings! Certainly cheap labour is not exclusively Chinese!

G. S. BOULGER.

Critical Researches on the Potamogetons. By J. O. HAGSTRÖM. 4to. Pp. 281, 119 figures in text. Stockholm: Almquist & Wiksells. 1916.

THIS work (reprinted from Kungl. Svenska Vetensk. Handl. Band 55, No. 5) is the most important that has been published on the genus, and is the result of many years labour. In the introductory part the author tells how he proceeded with his work, combining anatomical, biological and morphological characters. It may be doubted whether too great reliance has not been placed on the first of these. One regrets to see that Dr. Hagström considers that the results of cultivation are not as valuable as most of us think. He writes: "The hybrids must be studied according as Nature produces them. Cultivation and experiments in hybridization may not lead to great results as to the solution of this intricate question." To this I must demur: having seen the results of the late Alfred Fryer's work in this direction, I consider cultivation is a very great help—anyhow it affords a negative to some of the proposed hybrids given. With regard to the anatomical characters, the late C. B. Clarke once showed me at Kew the result of too great reliance on these: I think it was in the *Guttiferæ*, where the author of the monograph, relying on this, made two species of one plant.

Dr. Hagström's work contains thirty-seven new species, some twenty-one new hybrids, many varieties, and very many new forms. Of the species, two at least are founded on single specimens, without date or collector's name; even their origin is uncertain. To found Australian species on single specimens is certainly unwise: no country supplies more debatable species. No doubt some species might safely be so founded, as they stand apart from all others, such as *P. Robbinsii* Oakes, a North American species, of which a single leaf is sufficient for identification.

Having said this, I have nothing but cordial recognition to give of Dr. Hagström's work. He explains difficulties that have puzzled students of the genus for years, and though I differ from him in some of his conclusions, I feel that more work is needed before one can venture to deny them.

With regard to the endemic species, there seems something in the climatic influences that induces conditions not seen elsewhere—changes in the floating leaves, etc., that are difficult to explain. In one species, *P. australiensis*, these remarkable changes range from wide membranous leaves to narrow submerged floating leaves with very strong lattice-like structure. At least three species have been made out of this; it was only when numerous examples were seen that the plant was understood, hence my remark above as to single specimens.

The author disposes of my *P. dissimilis*, pointing out that it is really only a state of *P. striatus* Ruiz & Pavon, and in this I entirely concur. There is, however, perhaps some slight excuse for this, as he places *P. striatus* under three names.

Here and there one finds conclusions arrived at in one place and doubted in another. Thus the author assumes that *P. nodosus* Lam., which is not now known in Denmark, might formerly have occurred, and that climatic changes caused it to die out. Here of course is a hypothesis that cannot be proved or disproved; but elsewhere in the instance of a hybrid he remarks, "*P. nodosus* cannot enter into this as it is not known to occur there." If once this supposed occurrence of a species is accepted I do not see where the making of hybrids is to cease.

It must be remembered in dealing with the conclusions arrived at that Dr. Hagström's material consisted of all the Scandinavian herbaria, with a few from Petrograd and Berlin, so that so far as this goes his book may be accepted as a considered exposition of these herbaria. No doubt there may be difference of opinion even here, but the work demonstrates the value of his material. He makes several North American hybrids, assuming or suspecting the occurrence of one of the parents, but still he evidently knows his plants, and strong evidence must be adduced before his conclusions can be controverted.

Dr. Hagström shows that some species have been suggested on insufficient grounds, but by characters which are fully brought out he places them on a level with generally accepted ones. Thus he shows good grounds for accepting *P. panormitanus* Biv.-Bern., indicating how it can be separated from *P. pusillus* L.; some named forms of the latter will need examination to see whether they come under *P. panormitanus*. It is evident that he has not been able to examine some of the old types in the Berlin herbarium which he places under one name: doubtless many of these are merely climatal or geographical forms, but they will have to be considered. The Paris herbarium, which has not been consulted, will have to be examined before definite conclusions can be arrived at with regard to numerous species.

As the genus becomes better known, we may be able to explain why some species are found in Asia, Africa and Australia (if they are the same), *e. g. P. javanicus* Hasshl. Are the differences real, or are they induced by climatal or other influences? And why is Japan a meeting-place of so many species of all the world's area?

With the additional species here described, and accepting most of the species published up to the end of 1916, the genus now consists of some 140 species. I reserve for a future notice some notes upon the British species discussed, meanwhile pointing out that Dr. Hagström's work is essential to those botanists who wish to obtain a full knowledge of the genus.

A. BENNETT.

BRICKELLIA AND THE BRICKELLS.

A Monograph of the Genus Brickellia. By BENJAMIN LINCOLN ROBINSON (Memoirs of the Gray Herbarium, no. 1). Harvard University Press: Cambridge, Mass. 4to, pp. 151.

SPEAKING in the wide sense, the Brickellias are Eupatoriums with 10-ribbed achenes as contrasted with the 5-angled achenes of the latter genus. This character, unimportant as it would seem to plants in the struggle for existence, is an excellent one for taxonomic purposes, only a single species of the ninety-one here described being in this respect doubtful, so that its affinities have to be decided upon characters of minor importance. The genus, exclusively a New World one, is mainly found in Western North America, Mexico and the Central American republics, whence it extends sparingly to Bolivia and Eastern Brazil, with one species reaching the West Indies. Economically and horticulturally it possesses but slender interest.

The author has diligently searched for sectional characters, a matter of considerable difficulty which he seems to have overcome successfully, his nine sections appearing easily workable ones. Each species is accompanied by a careful description and a full list of its collectors arranged geographically. A list of exsiccatæ under the collectors' names, a very useful adjunct to a monograph, is also appended. Another most valuable feature is that every species has an inset illustration, showing not only the habit but containing an analysis of the floral structure. Though suspiciously like the ungracious fault of looking a gift horse in the mouth, one may perhaps regret that the illustrations showing portions of the inflorescence, generally drawn to a $\frac{3}{4}$-scale, are not natural size, as this would have required only a little more space. But as it is we heartily welcome this handsome monograph, which will enhance the author's already deservedly high reputation.

S. M.

In connection with his work on the genus, Dr. Robinson looked into the history of the name, the results of which form the subject of an interesting paper in *Rhodora* for November 1916. pp. 225–230. "It is evident," he says, "that in nearly all references to the dedication of the genus *Brickellia* two men of identical name were confused, both being presumably from the east of Ireland, both belonging to the same [medical] profession, both having biological interests, and both being authors of papers relating to phases of natural history." Whether the two were related, as seems probable, there is no evidence to show.

The earlier John Brickell (fl. 1730–45) was the author of *The Natural History of North-Carolina* (Dublin, 1737: plants, pp. 57–106) and of a *Catalogue of American Trees and Plants which will bear the Climate of England*, which I have not been able to see; we do not remember on what authority we stated (Biogr. Index, p. 22) that it was published in Dublin in 1745—according to Allibone, as quoted by Dr. Robinson, it was issued in London in 1739. The *Natural History* is stated by the same authority to have been first published in 1723, but there is nothing in the 1737 edition to suggest that the work had previously appeared: its dedication to Viscount Valentia and its printing "for the author" in Dublin seems to imply that Brickell was then living in Ireland, probably in the city mentioned.

Of the later John Brickell (1749–1809), Dr. Robinson's summary may be quoted: "Born in County Louth, Ireland, in or about 1749, [he was] for thirty years resident in Savannah, Georgia, where he died 22 December, 1809, an acute observer of the local vegetation, a man highly respected, author of several medical and botanical communications to the then prominent *Medical Repository* of New York, a friend of Muehlenberg, Fraser, and of Elliott, who dedicated to him the genus *Brickellia*."

J. B.

BOOK-NOTES, NEWS, ETC.

THE *Annals of Botany* for October last contains a paper by Dr. E. J. Salisbury on "Variations in *Anemone nemorosa*"—a subject also dealt with by Dr. Hermann Losch in *Berichte der Deutschen Botanischen Gesellschaft* (Band xxxiv. Heft 6: July 1916). Dr. Salisbury divides the species into three varieties—the first, "the normal type," he names var. *genuina*, in accordance with a practice which seems to us to substitute trinomial for binomial nomenclature. The others, var. *robusta* and var. *apetala*, whose characteristics are indicated by their names, appear to be rather forms than varieties: the latter, we are told, "bears much the same relation to the normal form as *Ranunculus auricomus* var. *depauperata* does to *R. auricomus* itself." But where *R. auricomus* grows in abundance, flowers in different stages of imperfection occur on the same plant, and individuals with complete blossoms may be found in the same patch: in this species the more or less apetalous plants seem hardly worth distinguishing even as forms.

The same number of the *Annals* contains an exceedingly interesting and important paper by Mr. Ridley on "Endemism and the Mutation Theory," in which he criticizes Dr. Willis's recent attempts "to formulate a law dealing with the rarity or commonness of species and its bearing on the endemic plants of Ceylon." Mr. Ridley shows that Dr. Willis's conclusions as to the frequency or rarity of species, based as they are upon the indications given in Trimen's *Flora of Ceylon*, are founded on insufficient data. This, however, is but one feature of the paper: Mr. Ridley, from personal knowledge and observation, gives much information on various points connected with plant-distribution: the destruction of species by man and the alterations of floras due to climatic changes are considered, and the theory of the evolution of species by natural selection is defended in opposition to "the mutation theory that new characters arise at a step, and that once they have appeared they remain hereditary and do not revert," which according to Mr. Ridley "is not in accordance with facts."

We have received the Eighth Report of the Botany Committee of which Mr. W. P. Hiern is Secretary, reprinted from the *Transactions of the Devonshire Association for the Advancement of Science*. It shows additions to the lists for the various districts but contains nothing very striking: *Phlomis fruticosa* appears to be established at Tormoham, in the Torquay district, "in one station falling for 18 m. over seaward limestone cliffs in a cataract of bloom."

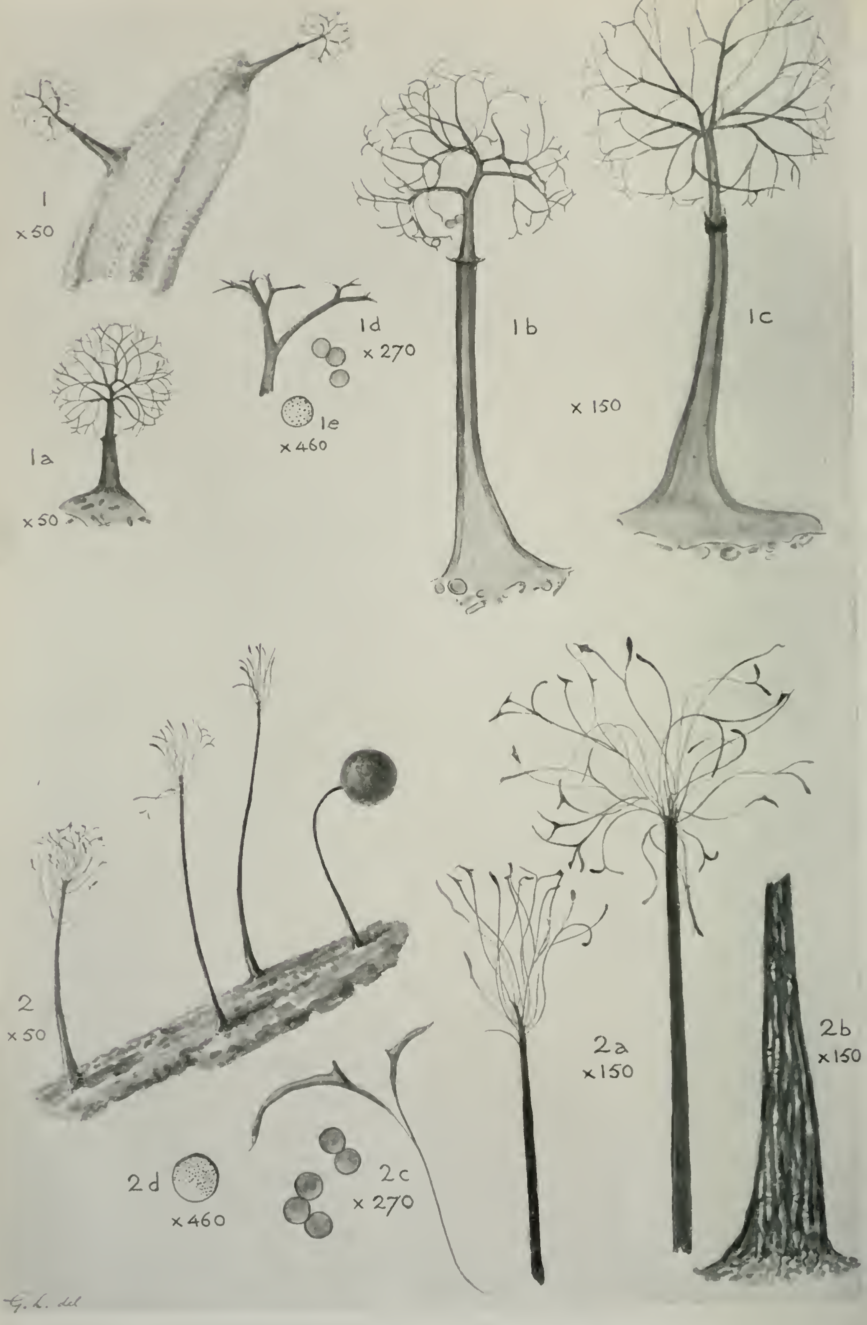
We have on previous occasions outlined the scope of Prof. L. H. Bailey's *Standard Cyclopedia of Horticulture* and expressed an opinion of its value. The fifth volume (Macmillan Co., New York, price 25*s.*) is now before us: it includes the letters P—R, and maintains the high level attained by its predecessors. Although the botanical portion is admirably done, the description of genera and species being full and clear, the interest of the work is mainly horticultural: thus we have fifty pages devoted to various aspects of Planting. There is a useful paper on Pollination by Mr. S. W. Fletcher, who treats the highly important questions of self-sterility and self-fertility of fruit trees. Much research has yet to be undertaken on this subject and work is progress in two or three horticultural centres in this coutry; this is most desirable, as the same variety often proves to be self-fertile in one locality and self-sterile in another. This phase of fruit production has received much attention in America, as is shown by the useful bulletins issued from the experimental stations of Oregon, Wisconsin, Minnesota, Missouri, etc. The *Cyclopedia*, which is nearing its completion, is a work of permanent value, and should be on the shelves of every important garden library.

Mr. Maiden has published a very useful and well executed *Census of New South Wales Plants* (Sydney, Gullick, 1916), "based upon Engler's classification and the first Australian Census following that order." It contains the Vascular Cryptogams and Phanerogams, the Cellular Cryptogams being reserved for a second part. "The Census contains references to the changes proposed by modern monographers, references to good pictorial illustrations, to useful botanical descriptions and notes, and specially to information bearing on the inclusion of species in the New South Wales flora." The only matter for criticism is the printing, in which the resources for facilitating consultation that are afforded by a judicious selection and employment of types are to a great extent ignored. In his preface Mr. Maiden acknowledges the help of the late Ernest Betche, the chief botanical assistant in the Sydney Gardens, whose death occurred on June 28, 1913.

The Journal of the Linnean Society (xliii. no. 293: dated Dec. 22 but not distributed until later) contains the interesting paper by Mr. T. A. Dymes "On the Seed-mass and Dispersal of *Helleborus fœtidus*" of which a summary was given in this Journal for 1916, p. 71. Mr. B. Millard Griffiths writes on "The August Heleoplankton of some North Worcestershire Pools"; in this numerous rare algæ were found on which notes are given, two of them—*Pteromonas ovalis* and *Crucigenia apiculata*—new to science. Mr. C. C. Lacaita gives a list of the plants collected by him in Darjiling and southern Sikkim in the spring of 1913; two new species are described—*Fragaria rubiginosa* ("= *F. vesca* var. *collina* Hook. fil. saltem quoad pl. Sikkimensem, sed minime *F. collina* Ehrh.") and *Rhododendron decipiens*, intermediate between *R. Hodgsoni* and *R. Falconeri*.

NEWSPAPER BOTANY. The following is from the *Daily Chronicle* of Feb. 21: comment would only detract from its charm: "Other British seaweeds besides carrageen moss make excellent eating. Among these are laver, samphire, dulse, erings (*sic*), and sea holly. Samphire used to be cried in the streets of London under the name of 'crest marine,' but apparently present-day costermongers never sell it. Laver tastes as good as spinach, and is more nutritious. Sir James Barrie tells us how to cook dulse. In *A Window in Thrums* he writes: 'Dulse is roasted by twisting it round the tongs when these are fired to a red heat'—a mode of cooking which gives it an oyster-like flavour. Dillisk, chopped up small and stewed in milk thickened with oatmeal, is a splendid dish. How many housewives know anything about these cheap delicacies?"

GEORGE EDWARD MASSEE, from 1893 until 1915 Principal Assistant in the Kew Herbarium and well known as a mycologist, died at Sevenoaks on Feb. 16. A fuller notice will follow in due course.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G. L. del

1. Comatricha cornea. 2. C. fimbriata.

TWO NEW BRITISH SPECIES OF COMATRICHA.

By G. Lister, F.L.S.

(Plate 548.)

The two minute species here described have been under observation for some years. They both appear to be related to *Comatricha laxa* Rost. and *C. nigra* (Pers.) Schroeter—species different enough when typically developed, but connected by a series of intermediate forms. A single development of *C. nigra* may produce along with robust sporangia, each crowned with a mop of dense and intricate capillitium a few curious dwarf sporangia, with much laxer and less flexuose capillitium, somewhat resembling dwarf forms of *C. laxa*. It was with such dwarfs that we attempted to class the two forms now under consideration. Thanks however to the Rev. William Cran, to whose unusually keen vision and careful observation students of Mycetozoa owe so much and to whom most of our knowledge of these new forms of *Comatricha* is due, it is found that their characteristic features remain unchanged in repeated developments; it therefore seems desirable that they should receive specific distinction, and not merely be regarded as varieties of well-known species.

Comatricha cornea G. Lister & Cran, sp. n.

Plasmodium colourless. Sporangia scattered or solitary, stalked, globose, dark brown, 0·12 to 0·32 mm. diam. Stalk subulate, slender, erect, 0·17 to 0·2 mm. high, dark brown above, shading into brownish-yellow below where it expands into a small discoid hypothallus, ringed where it merges into the columella with a well-defined dark collar. Columella cylindrical, slender, reaching one-third to one-half the height of the sporangium, forking or dividing above into the few primary branches of the capillitium. Capillitium of rather rigid dark brown threads, forking and branching repeatedly often at a wide angle, without or rarely anastomosing, ending at the surface in short diverging branchlets. Spores 8·5 to 9 μ diam., grey when highly magnified, marked with minute scattered warts.

Habitat. On bark and moss, Westhill and Kirkville, Skene near Aberdeen. Mr. Cran first observed this species in March 1913 in company with *Hymenobolus parasiticus* Zukal, on mossy bark kept under care indoors; since then it has appeared twice again on his cultures; he also found it in the open on plane bark at Kirkville in the summer of last year. The sporangia occur singly on bark or more often on the leaves of a moss (*Orthotrichum* sp.). The structure of the stalk is unusual; when mounted in glycerine it has the general appearance of a thick-walled hollow tube; closer examination reveals within the smooth walls of the tube a central strand of parallel pale brown fibres. In other species of *Comatricha* the stalk is usually black and opaque throughout; sometimes, however, as in the succeeding species, *C. fimbriata*, and in minute forms of other species, it is paler towards the base and encloses a loose network of dark interlacing strands. The yellow-brown base of the stalk is conspicuous in fresh specimens of *C. cornea*; after long preservation in glycerine the whole of the stalk and the capillitium are apt to assume a yellowish-olive colour. Other characters distinguishing *C. cornea* from *C. laxa* are the well-marked collar at the base of the sporangium, similar to that seen in *Lamproderma arcyrionema* (Rost.) and *Clastoderma Debaryanum* Blytt, and the free branches of the capillitium. The specific name *cornea* refers to the translucent horn-colour of the stalk. The description of *Orthotrichia Raciborskii* Cel. fil. (Myxomyceten Böhmens, p. 54) is applicable in some respects to the present species, but the sporangia are said to be densely clustered, the stalks black, 0·5 to 0·6 mm. long, and the spores 10 to 11·5 μ diam.; the capillitium threads are described as not anastomosing, but in a mounting of the type courteously lent by Dr. Celakovsky, although the extremities of the threads are free, the branches anastomose frequently elsewhere; the gathering, a single one from near Prague, appears to be a minute form of *C. nigra*.

Comatricha fimbriata G. Lister & Cran, sp. n. Plasmodium colourless. Sporangia scattered, stalked, globose, dark brown, 0·1 to 0·3 mm. diam. Stalks black, often inclined, very slender from a thicker base, 0·007 to 0·02 mm. diam. above. 0·02 to 0·07 mm. at the base, 0·3 to 0·5 mm. long. Columella slender, cylindrical, truncate or tapering above, reaching one third or one half the height of the sporangium. Capillitium arising from the upper part and apex of the columella, consisting of extremely slender pale purple-brown simple or sparingly branched threads, darker and usually forked above and ending in clavate or irregularly expanded tips. Spores 10 to 12 μ diam., greyish-purple, paler on one side, minutely and closely spinulose.

Habitat. On fallen sticks, Wanstead Park, Essex, and Skene and Hazelhead Wood near Aberdeen. *C. fimbriata* was first obtained in Wanstead Park, in November, 1913, by Mr. Raymond Finlayson. The developments consisted of about thirty minute sporangia on a dead bramble stem. In July 1916 Mr. Cran found it on a decorticated elm-stick in Westhill Avenue, Skene, and also on a paling-post lying among herbage in Hazelhead Wood. As soon as the spores have fallen away, which they do at the least breath, the sporangia with their scanty capillitium and hair-like stalks are most shadowy objects. The slender capillitium threads are often barely 1 μ diam. at the base; the flattened free ends measure from 2 to 5 μ diam. The lower part of the stalk, when mounted, is seen to consist of a sheath of purplish-brown anastomosing strands with slender connecting bars, enclosing a loose network of paler strands. The specific name *fimbriata*, suggested by Mr. Cran, refers to the fringe-like tuft of capillitium. It is not surprising that this well-marked but inconspicuous species should have escaped detection heretofore.

EXPLANATION OF PLATE 548.

Fig. 1. *Comatricha cornea* G. Lister & Cran. Two sporangia with spores dispersed, on moss-leaf; 1 *a*. large sporangium; 1 *b*, 1 *c*. sporangia showing variety in capillitium; 1 *d*. terminal branchlets of capillitium and three spores; 1 *e*. spore.

Fig. 2. *C. fimbriata* G. Lister & Cran. Group of sporangia, one retaining spores; 2 *a*. two sporangia showing capillitium; 2 *b*. base of stalk showing loose structure; 2 *c*. capillitium thread with expanded tips and five spores; 2 *d*. spore showing the smooth patch of dehiscence on one side of the wall.

ALABASTRA DIVERSA.—Part XXVII.

By Spencer Le M. Moore, B.Sc., F.L.S.

(Concluded from p. 106.)

Epallage africana, sp. nov. Herbacea, ± spithamea; *caule* erecto inferne nudo superne folioso ramulosque teneros filiformes emittente pubescente deinde glabrescente; *foliis* parvis petiolatis inferioribus ovatis obtusis basi truncatis margine lobulatis dentatisve junioribus angustioribus in bracteas transeuntibus omnibus utrobique scabriusculis; *capitulis* pro rata parvis pluriflosculosis in corymbos oligocephalos paucibracteatis caulem ramulisque terminantes digestis; *pedunculis* propriis filiformibus capitula longe excedentibus puberulis; *involucri* late campanulati phyllis 2–3-serialibus oblongis apice foliaceis obtusisque dorso puberulis; *receptaculi* paleis lanceolatis acuminatis ex involucro breviter eminentibus; *ligulis* usque circa 8 parvis uti disci corollæ breviter exsertis; *antheris* basi breviter caudiculatis; *styli* ramis brevibus compressis apice obtusis; *achæniis* linearibus aliquanto compressis angulatisque puberulis; *pappi* squamis ovatis laceratis aristis 5 achæniis brevioribus levibus alternantibus.

South Rhodesia, Wankie; n. 13229.

Folia summum 18 × 16 mm., plerumque vero minora, e. g. ± 12 × 8 mm., tenuiter membranacea; petioli 5–8 mm. long., filiformes. Pedunculi proprii plerique 2–4 cm. long. Bracteæ ± 4 mm. long. Capitula pansa 7 mm. diam. Involucrum 3·5 mm. long. Receptaculi paleæ 4 mm. long., apicem versus bidentatæ. Ligulæ oblongæ, apice 3-dentatæ, 4-nervosæ, 3 mm. long. Disci corollæ 2·25 mm. long. Achænia 1·5 mm. long. Pappi squamæ ·4 mm. long., aristæ ægre 1 mm. attingentes.

Epallage has hitherto been known only as a Madagascar genus. The filiform branchlets and peduncles and the small heads are the most easily seized features of the species.

Bentham describes the anthers as "subentire" at base, and refers the genus to *Helianthoideæ* and in this he is followed by O. Hoffmann. So far as I have studied the genus, however, I find the anthers to be distinctly although doubtless very shortly tailed, which suggests its proper place to be among the *Inuloideæ* close to *Sphacophyllum*, from which it differs only in the pappus.

Senecio oligolobus, sp. nov. *Ramis* lignosis gracilibus novellis laxe albo-araneosis cito glabris; *foliis* angustis pinnatifidis (summis sæpe integris) inferne petioliformi-extenuatis basi aliquanto dilatatis lobis paucis linearibus obtusis glabris; *capitulis* submediocribus heterogamis radiatis pluriflosculosis ad apicem ramulorum solitariis necnon pedunculo gracili sparsissime bracteato apice araneoso insidentibus; *involucri* campanulati puberuli phyllis 9–10 anguste ovato-oblongis obtusis vel obtusiusculis obscure sphacelatis margine membranaceis; *ligulis* luteis 6–7; *disci* flosculis circa 25, breviter exsertis; *antheris* basi minute auriculatis; *styli* ramis truncatis penicillatis; *achæniis* (haud maturis) oblongis compressis vel compressiusculis obscure costatis marginibus ciliatis; *pappi* setis scabriusculis albis.

Cape, Worcester Division, Orchard Siding; n. 16588.

Folia pleraque 5–8 cm. long. (inclusa parte petioliformi indivisa); horum rhachis apice integra vel dentata (haud lobata), modo 1–2 mm. lat.; lobi 2–10 × ·5–1 mm. Pedunculi circa 10 cm. long.; horum bracteæ filiformes, ± 7 mm. long. Capitula pansa 1·5 cm. diam. Involucrum 6 mm. long. Ligulæ anguste oblongo-obovatæ, apice truncatæ, 5-nervosæ, 6 mm. long. Disci corollæ anguste infundibulares, 6 mm. long.; harum lobi triangulares, 1 mm. long. Antheræ 4·5 mm. long. Styli rami 1 mm. long. Achænia immatura 2·5–3 mm., pappus 3·5 mm. long.

To be placed next *S. pinnulatus* DC.; diverse chiefly in the loose hairiness of the young parts, the short lobes to the leaves and the fewer heads upon much longer peduncles.

Senecio intricatus, sp. nov. Fruticulus intricate ramosus; *ramulis* ultimis paulisper cano-tomentosis rigidis sæpe nudis subspinescentibus; *foliis* parvulis petiolatis vel subsessilibus oblongo-spathulatis vel oblongo-obovatis obtusis basin versus extenuatis margine sat argute paucidentatis lobulatisve cito glabris; *capitulis* solitariis terminalibus longipedunculatis heterogamis radiatis circa 24-flosculosis (ligulis 1?–4); *involucri* campanulati obscure incani phyllis 12 lineari-oblongis apice acutis leviterque sphacelatis margine membranaceis additis calyculi phyllis paucis brevibus lineari-lanceolatis acutis vel acuminatis; *corollis* fll. ☿ exsertis flavis; *antheris* apice exsertis basi microscopice auriculatis; *styli* ramis truncatis penicillatis; *achæniis* ad huc crudis linearibus pubescentibus; *pappi* setis levibus albis.

Cape, Somerset Division, Cookhouse; nn. 2757, 3462.

Folia pleraque 5–10 mm. long., 2–3 mm. lat., in sicco viridia; petioli usque ad 3 mm. long. Pedunculi graciles, leviter incani, bracteis parvulis in calyculi phylla transeuntibus onusti, vulgo 2–3 cm. long. Calyculi phylla circa 3 mm. long. Involucrum 7 mm. long. Ligulæ spathulato-oblongæ, 4-nerves, breviter 3-dentatæ, 8 mm. long. Corollæ disci 7 mm. long.; harum lobi deltoidei modo ·75 mm. long. Antheræ 3·5 mm. long. Styli rami 1·5 mm., achænia 2 mm., pappus 5 mm. long.

Affinity with *S. tortuosus* DC. but having more intricate branching, also smaller, less deeply lobed leaves on shorter petioles and much smaller bracts upon the peduncles.

Tripteris Rogersii, sp. nov. *Caule* e rhizomate lignoso validoque spithameo ascendente sparsim ramoso una cum foliis viscidulo-scabrido dein glabrescente; *foliis* alternis sessilibus (basi levissime amplexicaulibus) acutis ambitu anguste oblongis sparsim dentiformi-lobulatis lobulis subulatis acutis; *capitulis* solitariis vel binis sat longe pedunculatis pedunculis paucibracteatis viscidulo-scabridis; *involucri* campanulati phyllis 2-serialibus exterioribus perpaucis lineari-lanceolatis acutis ceteris ovato- vel oblongo-lanceolatis acutis vel obtusis omnibus membranaceo-marginatis ciliolatisque dorso sparsim scabridis; *ligulis* paucis longe exsertis flavis; *antheris* basi breviter auriculatis; *achæniis* radii parvulis ovoideis scabridis fuscis sæpissime uno latere angustissime alatis.

Cape, Worcester Division, Orchard Siding; n. 16591.

Folia ± 1·2 cm. long., lobulis neglectis 1–1·5 mm. lat.; lobuli ipsi circa 1 mm. long. Pedunculi graciles, fere usque ad 3 cm. long., sæpe vero breviores; horum bracteæ anguste lineares, circa 5 mm. long. Capitula pansa fere 2 cm. diam. Involucrum 6 × 6 mm.; phylla apice dilute purpurea. Ligulæ oblongo-obovatæ, apice minute 3-denticulatæ, 4-nervosæ, 1 cm. long. Corollæ disci campanulato-infundibulares, 4 mm. long. Antheræ fere 2 mm. long. Achænia radii (haud matura) circa 3·5 mm. long., nonnunquam bialata vel exalata; ala undulata, crassiuscula, modo ·2 mm. lat.

The curious achenes combined with the indumentum and foliage easily serve as marks of this species.

Arctotis (§ *Euarctotis*) **microcephala**, sp. nov. *Caulibus* cæspitosis subspithameis gracilibus paucifoliis leviter araneosis ex rhizomate sat valido emissis; *capitulis* ∞-flosculosis longipedunculatis pedunculis bracteatis leviter araneosis; *involucri* subhemisphærici araneosi 4-serialis phyllis exterioribus lineari-lanceolatis (ser. ii. lanceolatis) acuminatis apice obtusis quam interiora late oblonga appendice ovata rotundata obtusave scariosa dilutissime punicea prædita plane minoribus; *receptaculo* subplano alveolis fimbrilliferis insperso; *ligulis* circa 20 oblongis apice microscopice 3-denticulatis 4-nervibus verisimiliter dilutissime cœruleis; *achæniis* disci parvis basi villosis paleis paucis oblongo-obovatis apice rotundatis coronatis.

S.W. Africa; *R. T. Jones* (*Hb. Rogers*, n. 15103).

Caules inferne sat validi (usque 3 mm. diam.), prope basin pauciramosi aliter simplices, superne attenuati (1 mm. diam.). Folia sæpius 2·5–4 cm. long., cujus dimidium fere inferius petioliformicoartatum, in sicco viridi-brunnea. Pedunculi 5 mm. long. vel ultra; hujus bracteæ lineares, ± 5 mm. long. Capitula pansa 2·5 cm. diam. Involucrum circa 11 × 12 mm.; phylla extima 3·5 mm. long., ser. ii. 4·5 mm., ser. iii. 7 mm., intima 9 mm. long. Receptaculum 5 mm. diam. Ligulæ 11 mm. long.; disci corollæ 4 mm. Achænia 1·25 mm. long.; horum costæ parum eminentes. Pappi squamæ exteriores 1 mm. long., interiores longit. 3 mm. paullulum excedens.

This has much the appearance of *A. venidioides* DC. which is a member of § *Pseudarctotis*.

Venidium serpens, sp. nov. *Caule* repente crebro radicante apice ramulos perpaucos incanos emittente pennæ corvinæ crassitie grosse striato cito glabro; *foliis* partim sparsis rhizomati insidentibus partim minoribus ex ramulis oriundis lyrato-pinnatifidis lobatisve apice obtusis petiolis latis basi dilatatis levissime amplexicaulibus fultis supra scabriusculis subtus subtiliter cano-tomentosis; *capitulis* ∞-flosculosis scaposis sub apice caulis genitis pedunculum elongatum cano-tomentosum coronantibus; *involucri* subhemisphærici 5-serialis phyllis exterioribus lanceolatis acuminatis (ser. iii. obtusis) interioribus oblongo-ovatis et membrana rotundata dilute punicea præditis; *receptaculo* plano; *ligulis* pluribus longe exsertis oblongis 4-nervibus apice 3-denticulatis; *antheris* basi brevissime auriculatis; *stylo* leviter exserto biramoso; *achæniis* ovoideis calvis glabris.

South Africa; sine no. nec loc.

Folia usque ad 20 cm. long. (incluso petiolo 5–8 cm. long.), summum 4 cm. lat.; folia ramulorum sæpius 5–10 cm. long., summum 1·5–2 cm. lat.; omnium costæ pag. inf. optime eminentes. Pedunculi 25 cm. long., 1–2 mm. crass. Capitula pansa circa 3 cm. diam. Involucri phylla extima 5 mm., intermedia 8 mm., intima 9 mm. long. Ligulæ 13 mm., corollæ disci 5 mm. long. Antheræ 2 mm., stylus 6 mm., achænia cruda 1 mm. long.

The repent habit together with the long and lengthily stalked leaves afford good means for identifying the species.

Venidium Rogersii, sp. nov. Herba perennis; *caule* repente radices crebros emittente hac atque illac caules foliaceos sese sæpe radicantes gignente; *foliis* juxta apicem caulium confertis longipetiolatis ovatis obtusis basi coartatis margine argute dentatis membranaceis primo tomento cano indutis supra mox glabrescentibus; *capitulis* solitariis pedunculis elongatis cáno-tomentosis fultis ∞-flosculosis flosculis radii fere 20; *involucri* late campanulati canotomentosi phyllis 5-serialibus extimis intermediisque deltoideo-triangularibus obtusis vel obtuse acutis interioribus ovato-oblongis membrana brevi apice rotundata vel leviter emarginata sæpe denticulata dilute punicea onustis; *receptaculo* plano; *ligulis* bene exsertis oblongis apice minute 3-denticulatis; *antheris* basi leviter sagittulatis; *styli* ramis vix apicem usque connatis; *achæniis* calvis glabris.

Bechuanaland, Mochudi; *C. C. Harbor* (*Hb. Rogers*, n. 6603).

Foliorum lamina sæpissime 5–8 cm. long., 2·5–3·5 (raro 4·5) cm. lat., supra in sicco dilute viridis; petioli fere 10 cm. raro attingentes, plerique ± 5 cm. long., cano-tomentosi. Pedunculi circa 6–8 cm. long. Capitula pansa diam. circiter 2 cm. Involucrum 9×12 mm.; phylla extima 4 mm. long., intermedia 5·5 mm., interiora 6·5 mm., intima 5·5 mm. long. Ligulæ 8·5 mm. long. Disci corollæ infundibulares, 3 mm. long., exemptis lobis oblongis 1·5 mm. long. Antheræ 2 mm., stylus 2 mm. long. Achænia maxime cruda obovoidea, 1 mm. long.

In habit somewhat resembling *V. microcephalum* DC. and *V. erosum* Harv., but entirely different in foliage.

Venidium Bellidiastrum, sp. nov. Acaulescens; *rhizomate* valido lignoso sparsim radicante; *foliis* rosulatis parvis sessilibus spathulatis margine dentato-crenatis firme membranaceis canotomentosis supra cito glabrescentibus; *scapo* monocephalo foliis longiore pedunculo gracili incano insidente; *capitulis* pro rata parvis ∞-flosculosis; *involucri* subhemisphærici cano-tomentosi 4-serialis phyllis exterioribus lanceolatis sursum acuminatis apice obtusis vel obtusiusculis interioribus ovato-oblongis et membrana parva scariosa dilute punicea apice rotundata præditis; *ligulis* fere 20 longe exsertis lineari-oblongis 4-nervibus apice 3-dentatis; *antheris* basi sagittulatis; *stylo* ex andrœcio breviter eminente apice bifido; *achæniis* ovoideis glabris. calvis.

Transvaal, Standerton; n. 18758.

Folia profecto evoluta 3 cm. long., summum (in triente superiori) 1 cm. lat., supra in sicco pallide viridia. Scapus 4·5 cm. alt. Capitulum pansum circa 2·5 cm. diam. Involucrum 7 mm. long.; phylla exteriora 3·5–5 mm., interiora 6·5–7 mm. long. Ligulæ 12 mm., antheræ 2·5 mm., stylus vix 5 mm. long., hujus ramis connatis haud exemptis. Achænia cruda, 1 mm. long.

To be inserted next *V. microcephalum* DC., which, among other features, is not entirely stemless and has larger lyrate-sinuate or pinnatifid petioled leaves.

Venidium Bolusii, sp. nov. Acaulescens, cæspitosum; *rhizomate* valido radices longas subsimplices emittente; *foliis* rosulatis lyrato-lobatis-pinnatifidisve basin versus longiuscule petioliformi-extenuatis basi paullo dilatatis membranaceis utrobique cano-tomentosis pag. sup. dein glabrescentibus; *inflorescentia* scapum monocephalum abbreviatum foliis plane breviorem cano-tomentosum referente; *capitulis* pro rata parvis pluriflosculosis; *involucri* subhemisphærici cano-tomentosi phyllis 4-serialibus exterioribus subpanduriformibus sub apice dilatatis apice ipso obtusis interioribus ovato-oblongis membrana scariosa obtusissima viridi onustis; *ligulis* circa 14 exsertis late oblongis 4-nervibus apice minute 3-denticulatis; *antheris* basi microscopice auriculatis; *styli* ramis connatis apice bifidis; *achæniis* maxime crudis subcylindricis glabris.

Cape, Vlaakplants, Richmond Division; *H. H. Bolus* (*Hb. Rogers*, n. 13804).

Folia 2–4 cm. long., summum 7–10 mm. lat. Pedunculus 1 cm. long. vel etiam minus. Capitula pansa circa 1·5 cm. diam. Involucri phylla ext. 5–6 mm., int. 5·5–7 mm. long. Ligulæ verisimiliter flavæ, 8 mm. long. Antheræ 2 mm., stylus (ramis 1·5 mm. long. inclusis) 3 mm., achænia (adhuc cruda) 6 mm. long.

Near the last described but different in foliage, short scape, and smaller heads.

Berkheya (*Stobæa* § *Apuleia*) **cousinioides**, sp. nov. Fruticulus carduaceus, *caule* stricto superne ramoso ob folia decurrentia 4-alato (alis denticulatis) uti rami frequenter folioso tomentoque brevi albo obtecto; *foliis* alternis raro oppositis sessilibus rigidis plerumque trilobis (summis integris) lobis apice spinescentibus lateralibus quam intermedius manifeste minoribus supra mox glabris pallide nitidis prominenter reticulato-nervosis subtus albo-tomentosis; *capitulis* sessilibus pro rata parvulis homogamis 5–6-flosculosis ramulos ultimos solitatim coronantibus; *involucri* phyllis lanceolatis apice spinulosis margineque spinulis distantibus onustus dorso albo-tomentosis; *achæniis* adhuc crudis anguste turbinatis obscure costatis glabris; pappi paleis late oblongis apice ciliolato-denticulatis.

Transvaal, Lydenburg; n. 14546.

Folia pleraque 2–3 cm. long.; lobi laterales ± 5 mm., lobus intermedius ± 15 mm. long. Capitula pansa circa 10 mm. diam. Involucri phylla pleraque 6–8 mm. long. Receptaculi alveolæ in toto 8 mm. alt.; horum fimbrillæ inæquales, plerumque 3–6 mm. long. Corollæ extus subtiliter glandulosæ, fere 1 cm. long. Achænia 3 mm. pappus ægre 1 mm. long.

The very small heads afford an easy means of distinguishing this species.

Berkheya (*Stobæa* § *Apuleia*) **polyacantha**, sp. nov. Planta bispathamea; *caule* valido erecto simplici strigoso-piloso prominenter alato alis undulato-lobulatis spinis longitudine varia munitis; *foliis* radicalibus elongatis ambitu anguste oblongo-obovatis dimidio inferiori attenuatis apice spinosis margine lobato-pinnatifidis lobis (uti rhacheos margines) dentatis vel denticulatis spiniferisque supra scabridis subtus (nervis piloso-pubescentibus exclusis) subtiliter albo-tomentosis; *foliis* caulinis alternis radicalibus similibus nisi minoribus et decurrentibus et basin versus haud angustatis junioribus gradatim imminutis tandem in bracteas transeuntibus; *capitulis* magnis heterogamis radiatis ∞-flosculosis brevipedunculatis perpaucis (circa 3) ad apicem caulis glomeratis; *involucri* phyllis anguste oblongis apice rigide marginibus debilius spinosis utrobique minute puberulis; *ligulis* paullo ultra 20, exsertis; *antheris* basi breviter caudatis; *stylo* exserto; *achæniis* turbinatis glabris; *pappi* paleis achænio paullo brevioribus oblongo-obovatis apice ciliolato-denticulatis.

Transvaal, Standerton; n. 18459.

Alæ caulis circa 2 mm. lat. Folia radicalia 20 cm. long., summum (spinis exemptis) 3·5 cm. lat.; rhachis ± 1·5 cm. lat., horum spinæ longiores 6–8 mm. long., ceteræ breviores. Folia caulina pauca inferiora 11–13 cm. long., summum 3 cm. lat.; rhachis circa 1 cm. lat., superiora 3–8 cm. long., summa linearia, 2 cm. long. Bracteæ 2 cm. long. Pedunculi scabridi, circa 2·5 cm. long. Capitula pansa circiter 5 cm. diam. Involucri phylla 13–15 mm. long., inclusa spina terminali 5–6 mm. Ligulæ oblongæ, 4-nervosæ, 3-dentatæ, fere 2 cm. long. Corollæ disci ægre 7 mm. long. Achænia 1·75 mm., pappus 1·5 mm. long.

The description of *B. Kuntzei* O. Hoffm. reads much like that of this plant and there is doubtless affinity between the two. Hoffmann says nothing about radical leaves, hence it is to be presumed that the leaves he describes are all cauline, which makes them to be much larger than those of the new species, besides which they are said to be glabrous above. Moreover the stem wings of *B. Kuntzei* are broader, the heads are panicled and their involucral leaves linear.

Gerbera (§ *Lasiopus*) **speciosa**, sp. nov. *Foliis* e collo lanoso elongatis oblongo-obovatis obtusis vel obtusissimis dimidio proximali in petiolum haud longum gradatim attenuatis margine integris vel summum undulatis nisi minute denticulatis chartaceis utrinque velutinis; *scapo* valido folia facile superante monocephalo dense fulvo-tomentoso; *capitulis* magnis heterogamis ∞-flosculosis; *involucri* subhemisphærici phyllis 3-serialibus lineari-lanceolatis acuminatis extimis dorso pubescentibus ceteris fere glabris; *ligulis* ∞ extimis ultra 30 longe exsertis anguste lineari-oblongis obscure 3-denticulatis puniceis interioribus quam extimæ multo minoribus inclusis; *disci* flosculorum lab. ext. ovato-oblongo apice 3-dentato labio int. 2-partito æquilongo; *antheris* basi simpliciter caudatis; *stylo* fll. ☿ incluso ramis brevibus obtusis; *achæniis* linearibus compressis breviter rostratis sericeis; *pappi* setis scabriusculis inferne stramineis superne rubiginosis.

Transvaal, Pilgrim's Rest; *R. Pott* (*Hb. Rogers*, n. 14322).

Foliorum lamina 15–25 cm. long., paullo supra medium 6·5–7 cm.

lat.; costæ laterales utrinque 8, in pagina utravis bene aspectabiles reticulum laxum vero male; petioli 5 cm. long., satis lati, basi dilatati lanatique alibi pilosi. Scapus ultra 60 cm. long., 2·5–3·5 mm. crass. Capitula pansa 5 cm. diam. Involucrum 1·5 × 2 cm. Ligulæ ext. 13 mm. long.; corollarum disci labium ext. circa 3 mm. long. Antheræ 5 mm. long. (caudis 1 mm. long. haud exemptis). Stylus fll. disci 7 mm. long. Achænia 9 mm. long. (rostro incluso 3 mm.). Pappus 10 mm. long.

The large leaves velvety on both sides, the long scape with its large head and the stramineous and reddish pappus are the points more easily seized on in distinguishing this fine species.

INVERNESS-SHIRE PLANT-NOTES.

By the Rev. E. S. Marshall, M.A., F.L.S.

We stayed at the Loch Laggan Hotel from July 11 to August 9, 1916. Mr. and Mrs. F. J. Hanbury were members of our party; Mr. W. D. Miller was also with us for over a fortnight, and Mr. W. A. Shoolbred for about ten days. This neighbourhood (partly in 97 W. Inverness, and partly in 96 E. Inverness) did not seem to be rich in alpine vegetation; but the season was extremely backward, and our leave to explore one of the most promising deer-forests expired before it was in good condition.

Hieracia were numerous and interesting. I am under special obligation to the Rev. E. F. Linton for his great help in working these out. New records are starred.

Caltha palustris L., var. *minor* Syme. **97.** Frequent in rills on the north side of the range between Loch Laggan and Glen Spey, from 3000 to 3300 feet. This tends to root at the nodes, and may really come under *C. radicans* Forster, as was suggested by Prof. Haussknecht many years ago. The sepals are often brownish on their under-surface.

Viola palustris L. **97.** The beautiful variation with white flowers (forma **alba* Gregory), hitherto only known from Killarney, was found in small quantity by Mr. Miller in one of the Creag Meaghaidh corries at 3000 feet.

V. lutea Huds. **97.** A pretty cream-coloured form occurred on grassy hillocks, about a mile east of Loch Laggan, with the violet-flowered forma *amœna* (Symons), which is locally common; we did not observe the type.

Geranium sylvaticum L., var. *parviflorum* Blytt. **97.** Moist meadow, below the Loch Laggan Hotel; with the type, and only differing by its very small flowers.

Anthyllis Vulneraria L. **96.** A striking variety is plentiful on shingle by the Spey and elsewhere, about Laggan Bridge, and was gathered near Newtonmore Station. Slender, prostrate. Corollas small, yellow; keel often reddish. Calyx *bicolorous* (upper part purplish red), clothed with white, spreading, silky hairs. It seems to be var. **pulchella* Vis., Fl. Dalm. Suppl. p. 141 (*A. communis* Rouy, var. *pulchella* Rouy & Foucaud, Fl. de France, iv. p. 287). This is not given in our lists.

[*Saxifraga umbrosa* L. has been freely planted by drives on the Ardverikie estate, near Loch Laggan; and in one place we saw the garden hybrid *S. Andrewsii* Harvey = *S. Aizoon* × *umbrosa*.]

Drosera anglica × *rotundifolia* (*D. obovata* Mert. & Koch). **97.** Fine and locally abundant, at 1300 feet, in bogs near the Allt na h' Uamha, Lochaber, N.W. of Loch Laggan; also, at 1100 feet, above Moy Lodge. It grows in rather dense tufts, as a rule.

Sambucus Ebulus L. **96.** Well established at and near the ruins of Ruthven Castle, E. of Kingussie.

Hieracium anglicum Fr. **97.** Remarkably uncommon; the type was only noticed near the south shore of Loch Laggan, and var. *longibracteatum* F. J. Hanb. on the banks of the River Pattack, a little east of the bridge near the loch. No *H. iricum* occurred.

H. langwellense F. J. Hanb. **97.** Moy Burn, Lochaber.

H. holosericeum Backh. **97.** Very fine in Coire nan Gall.

H. eximium Backh. **97.** Coire nan Gall; the almost entire-leaved rock-form mentioned in Backhouse's *Monograph*, p. 22.

H. calenduliflorum Backh. **97.** Coire nan Gall.

H. curvatum Elfstrand. **97.** Coire nan Gall; scarce.

H. Backhousei* F. J. Hanb. **96. In small quantity on rocks at 2800 feet, Geal Charn, above Glen Markie.

H. Marshalli Linton. **96*.** Geal Charn. **97*.** Coire nan Gall; this may be var. *cremnanthes* F. J. Hanb., as the toothing is very coarse.

H. chrysanthum Backh. **97.** Coire nan Gall; untypical in its livid styles and ciliate ligules. Immature specimens, apparently the same thing, were found by Mr. Miller on one of the Ardverikie Forest hills.

H. sinuans* F. J. Hanb. **97. Coire nan Gall.

H. submurorum Lindeberg. **97.** Coire nan Gall.

H. centripetale* F. J. Hanb. **96. Pipen's Burn, Glen Markie; Allt Coire Dhuibh, Glen Shirra. At 1500 feet, in both cases.

H. hyparcticum* Almquist, forma. **96. Allt Coire Dhuibh, with the previous species. Our larger specimens agree very closely with the original British ones from near Inchnadamph, W. Sutherland, and with Hanbury's figure; our smaller plants superficially resemble *H. eupreps*, but their head-clothing is quite unlike. An interesting extension of its Scottish range, on non-calcareous soil.

H. Leyi* F. J. Hanb. **97. Coire nan Gall; a form with pure yellow styles, and ligule-tips very ciliate.

H. Schmidtii* Tausch. **96. Sparingly on river-shingle near Laggan Bridge; a narrow-leaved, very hairy plant, coming nearest to the form which grows by the Naver, below Betty Hill, W. Sutherland, but tending towards the group of *H. oreades* in some respects.

*97. *H. rubicundum* F. J. Hanb. **97.** Allt Coire Choille-rais; Coire nan Gall, up to 2500 feet.

*97. *H. caesiomurorum* F. J. Hanb. (alpine variety, or form). **97.** Rocks, at 1500 feet, Craig na Caillich, above Moy, Lochaber; also at

2500 feet in Coire nan Gall. These approach *H. argenteum* in habit, being unusually narrow-leaved; but they are less glaucous, with more glandular and less pilose heads and peduncles, and slightly ciliate ligules. They are practically the same as my No. 3419 from Beallach Corrie, Ben Wyvis, v.c. 106. Mr. Druce has found this species in central Scotland; but I forget the locality.

H. argenteum Fr. **97**. Creag na Cailliche; Mr. Hanbury gathered some fine specimens near Tulloch Station. **96**. Abundant on river-shingle, Laggan Bridge.

**H. pseudonosmoides* Dahlst. Frequent and often luxuriant on rocks above the road, close to Loch Laggan Hotel; also about two miles eastward.

H. callistophyllum F. J. Hanb., var. *cremnanthes* F. J. Hanb. **97**. Coire nan Gall. This comes very near *H. Marshalli*, under which it was first described; indeed, I think that *H. callistophyllum* should follow that species, and belongs to the *Alpina Nigrescentia*, rather than to the *Silvatica* group.

H. silvaticum* Gouan, var. *subtenue* W. R. Linton. **96. Pipen's Burn.

H. ciliatum Almq. **97**. Allt Coire Choille-rais; also on rocks above the River Pattack, two miles or more E. of Loch Laggan. Very like the W. Yorks specimens in the Lintons' Set.

H. pictorum Linton. **96**. Pipen's Burn.

H. petrocharis* Linton. **97. Shaded rocks near the Loch Laggan Hotel, at the remarkably low level of about 850 feet. "Heads very good for that; leaves a bit off type" (E. F. L.).

H. sagittatum* Lindeberg, var. *lanuginosum* Lönnroth? **97. Mr. Linton suggests this name for two of our gatherings, from rocks above the Pattack, and from the Allt Coire Choille-rais.

H. rotundatum* Kit. **97. Allt na h' Uamha; Allt Coire Choille-rais.

H. dissimile* Lindeberg, var. *poliænum* Dahlst. **96. On shingle by the Markie Burn, Crathie. Differs from our usual form in foliage, and in the considerably more floccose heads and peduncles.

H. porrigens* Almquist? **97. Four examples (only in bud) of a plant very near this, but also approaching *H. rectulum* Ley, occurred by the Allt na h' Uamha, at 1400 feet.

H. duriceps* F. J. Hanb., var. *cravoniense* F. J. Hanb. **97. Rocky ground, a little east of Loch Laggan. I now name this with some confidence, after making two "bad shots"; it is considerably larger than any of my herbarium material, but agrees in all essential points. Styles dark. Ligules (often imperfect) glabrous. Heads with many white hairs; glands few. Leaves firm, deep green, becoming yellowish.

H. vulgatum* Fr., var. *subravusculum* W. R. Linton. **97. Very fine in fir-plantations, &c., near the east end of Loch Laggan. I believe that I also saw this between Laggan Bridge and Cluny Castle (**96**); but no voucher was preserved.

H. acroleucum* Stenström. **96. Markie Burn, at Crathie. "Agrees with the average of my Swedish *acroleucum*; the glands on the phyllaries vary much, from hardly any to several, as here" (E. F. L., in litt.).

H. diaphanoides* Lindeberg, var. *apiculatum* Linton. **96. Markie Burn, Crathie, on shingle. A rare form, only known before from the Clova district and near the Spital of Glen Shee.

H. diaphanum* Fr., var. *glaucovirens* Dahlst. **96. Frequent by the Spey, &c., about Laggan Bridge and Crathie; agreeing closely with most of my authoritatively named material. Rather near the previous plant in heads, though these are smaller; but differing greatly in its taller, more slender habit, and in the thin, less deeply-toothed foliage, which is often purplish red.

H. gothicum Fr. **96**. Remarkably abundant on grassy banks, by river-sides, &c., about Crathie, Laggan Bridge, and Cluny Castle; styles always pure yellow in this neighbourhood. Here it varies much; besides the normal form (which is, perhaps, the most plentiful), I saw specimens matching that called by Lindeberg var. *basifolium*. Another has so much white hair on the heads that I mistook it for *H. sparsifolium*; and a third has the phyllaries a good deal clothed with floccose down.

H. stictophyllum Dahlst. ***96**. Plentiful by the Markie Burn and Spey, about Crathie and Laggan Bridge. ***97**. Near the east end of Loch Laggan (occasionally with concolorous leaves); ascending to 2000 feet on Carn Liath. Styles (here) invariably pure yellow.

H. sparsifolium* Lindeberg. **96. Grassy slopes, about halfway between Laggan Bridge and Cluny Castle; this may be an undescribed variation, differing from the type by its golden styles and more glandular heads.

H. reticulatum Lindeberg, var. **amplidentatum* F. J. Hanb. (described under *H. strictum* Fr.). **96**. One very characteristic plant, by the Spey, below Crathie. What was almost certainly this, but only seen in bud, grew on rocks, two miles or more east of Loch Laggan (**97**).

H. auratum Fr. **97**. Frequent in the valley of the River Pattack.

H. umbellatum L., var. **linariifolium* Wallr. **96**. Grassy slopes between Laggan Bridge and Cluny Castle.

Taraxacum spectabile Dahlst. Common on the mountains; foliage usually blotched (var. *maculigerum* Dahlst.).

Vaccinium Vitis-Idæa L. **97**. A very luxuriant form, or state, abounds in the fir-woods on the Ardverikie domain.

Pyrola media Sw. and *P. minor* occur here and there, about Ardverikie; *P. secunda* L. was also seen, scarce and barren, but it flowered on rocks by the Allt na h' Uamha.

Rhinanthus major × minor (× *Alectrolophus fallax* Sterneck). **96**. I think that a puzzling plant, found rather plentifully in moist pastures near the Spey at Laggan Bridge, is probably this hybrid. Intermediate in habit. Bracts pale green. Corolla-appendages often spreading horizontally, as in *R. major*. Seed-wing narrow.

R. stenophyllus Schur. **96, 97**. Common in low-lying pastures; observed as high up as 1300 feet, but much reduced in size.

R. monticola Druce. **97**. Grassy moorlands, Ardverikie Forest, above 1000 feet.

R. borealis Druce. ***96**. Geal Charn. **97**. Coire nan Gall. From 2500 to 2700 feet; very fine, broad-leaved examples, occasionally over a foot high, were obtained. The allied segregate *R. Drummond-Hayi* we did not see.

Melampyrum pratense L., var. *purpureum* Hartman (Skand. Fl., ed. 1). **97**. Carn Liath, from 2800 to 3000 feet. Corolla yellowish white, beautifully streaked and tipped with bright crimson. I believe that this is an alpine colour-variation of Johnston's *M. montanum.*

Betula pubescens Ehrh. **97**. A young bush, growing in damp woodland above the River Pattack, was much infested with a crimson parasitic growth, looking like a fungus. Mr. W. Watson, of Taunton School, to whom I sent fresh pieces, at first thought this to be *Melampsora betulina*, a 'rust'; but microscopical examination proved that it was of a different nature. Later on, he submitted it to Prof. Swanton, who reported that the felt of red hairs was due to the mite *Eriophyes rudis* Canest, var. *longiseta* Nalepa (see his *British Plant Galls*, No. 198). "There is an illustration of this in Greville's *Cryptogamic Flora*, p. 21. Greville thought the felt was a fungus, and called the club-shaped hairs sporidia, thinking that they had something to do with the reproduction of the plant by spores. The name given to this supposed fungus was *Erineum betulinum* Schum."

Salix aurita* × *viminalis.* **96. On shingle by the Markie Burn, Crathie; decidedly on the *viminalis* side, but showing the influence of the other parent in its dwarf habit (not over 18 inches high); the shorter, relatively broader, cuneate-based leaves; their frequent denticulations; and the glabrescent wood.

S. aurita* × *phylicifolia.* **96. Growing near the last; a good intermediate, as Mr. Linton agrees.

S. lapponum L. **96, 97**. Here and there on the hills, but not very common.

S. caprea L., var. **sphacelata* Wahlenberg (*S. sphacelata* Sm.). **96**. By the Spey, above and below Crathie. **97**. Allt Coire Choille-rais, at about 1800 feet (seen and passed by E. F. L.).

Orchis incarnata L. **97**. The purplish-red form is common near Loch Laggan; that with flesh-coloured flowers being scarce.

Habenaria viridis Br., var. *bracteata* Gray. **97**. Coire nan Gall, at 2500 feet; less well-marked, east of Loch Laggan. Hardly deserves to rank as a variety; intermediates are numerous.

Juncus tenuis Willd. **97**. A few tufts by a cart-track above Loch Laggan Hotel, whence it may spread to the main road.

Eriophorum latifolium Hoppe. **97**. Apparently rare; only seen in one moorland bog, S.W. of Loch Laggan.

Carex atrata L. **97**. Frequent in Coire Ardair and Coire nan Gall.

C. Goodenowii Gay, var. *chlorostachya* Ascherson. **95**. Moorland swamp, Strath Mashie. Fruit light green, much exceeding the glumes. Near this grew a somewhat different form, which may be var. *angustifolia* Blytt, *Norges Flora*, p. 213 (1861), a name suggested by Mr. Bennett; as did *C. panicea* L., var. *tumidula* Laestadius, and *C. lasiocarpa* Ehrh.

C. saxatilis L. (pulla Good.). **97**. Only seen in Coire Choille-rais, at 2800 feet.

Phleum alpinum L. **97**. Coire nan Gall and Coire Choille-rais, from 2500 to 2800 feet.

Deschampsia flexuosa Trin., var. *montana* Hook. fil. (*Aira montana* Huds.). Common on the range N. of Loch Laggan.

Melica nutans L. **97.** Apparently rare; we only noticed it on a rock above the road, 2½ miles E. of Loch Laggan.

Athyrium alpestre Milde. **97.** Corries north of Loch Laggan, in profusion and very variable; much of it agreed rather well with Syme's description of his var. *obtusatum*. Stipes often extremely short, suggesting *A. flexile* Syme; but I saw nothing which matches authentic material.

Equisetum sylvaticum L., var. **capillare* (Hoffm.). **97.** Damp wooded rocks above the River Pattack.

E. palustre L., var. **tenue* Döll. **97.** Wet bogs, Strath Mashie.

MYCOLOGICAL NOTES.—III.

By W. B. Grove, M.A.[*]

Amphichæta europæa Grove, sp. nov. Acervulis gregariis, caulicolis, præcipue prope nodos dispositis, ovalibus v. oblongis, subatratis, primo tectis, deinde erumpentibus nudatisque, usque ½ mm. longis, prominulis, denique elabentibus foveolasque minutas relinquentibus. Sporis ellipsoideis, pedicellatis, 3-septatis, non constrictis, 12–15 × 4½–5 μ, loculis interioribus olivaceis, pedicello deciduo, recto, 10 × 1½–2 μ, cætera trimorphis—(1) loculis extimis subconicis, hyalinis, inferiore tantum seta oblique inserta, 8–14 × 1 μ, pedicellum subæquante v. breviore, instructo; (2) loculo superiore æque seta flexuosa v. incurva sporam subæquante instructo; (3) loculo superiore dilute fuscidulo v. olivaceo, superne obtuse rotundato, non aristato.

Hab. in sarmentis crassis emortuis *Vitis viniferæ*, King's Cliffe (*Berkeley*, Martio, 1851).

Berkeley's specimen has remained for over 65 years unnoticed in the Kew Herbarium and undescribed. It is localised in his own handwriting and accompanied by one of his well-known little sketches, in which, however, the setæ are not shown. *Amphichæta* has been known hitherto only from California (for *Pestalozzia? anomala* Harkn. is an *Amphichæta*) and from Australia, where several species occur on leaves and stems, and of these *A. Hakeæ* Grove shows exactly the same trimorphism as *A. europæa*.

Nevertheless, the present species has been met with on another occasion in Europe, viz. in France, but was ill-observed and therefore misdescribed by Briard (in Rev. Mycol. 1886, p. 25) under the name *Pestalozzia monochætoidea* var. *affinis* Sacc. & Br., "sur les sarments morts et coupés du *Vitis vinifera*." It happens that the spores which have only the basal seta are most common, and the pedicel is very deciduous. In order, therefore, to get the seta apical (as it should be in *P. monochætoidea*) Briard turns the spores upside down and says that they are "arrondies généralement ou attenuées quelquefois à la base, à loge supérieure conique et hyaline, celle de la base plus obtuse et de couleur plus foncée."

Puccinia longissima Schröt. *Uredo-sori* epiphyllous, arranged in rows or little groups between the nerves, marked on the lower surface by discoloured spots, oblong, about ½ mm. in length, surrounded by the split epidermis, deep orange-brown, somewhat like those of *P. dispersa*, at length pulverulent; spores ovoid or roundish, rather thin-walled, but provided with several scattered thickened areas (pores), about 25–30 μ diam., finely echinulate, with orange contents and a yellowish or pale-brown coloured membrane, often much like that of *P. dispersa*; pedicels long, slender, broadened at top. *Teleuto-sori* similar but narrower, more often lanceolate, surrounded and partly covered by the cleft epidermis, at length naked, but not pulverulent, deep chestnut-brown; spores elongate, oblong or subclavate, yellowish-brown, 60–120 × 12–20 μ; upper cell ellipsoid or cylindrical, thickened above (up to 10 μ) where it is rounded or attenuated to a blunt (sometimes oblique) point and darker, *i. e.* chestnut-brown; lower cell usually ± cylindrical, mostly longer than the upper one (by as much as one-third), paler and narrower, sometimes, especially when shorter, attenuated downwards and obovoid or pyriform, thin-walled; a constriction at the darker septum or none; pedicels short, pale-brownish.

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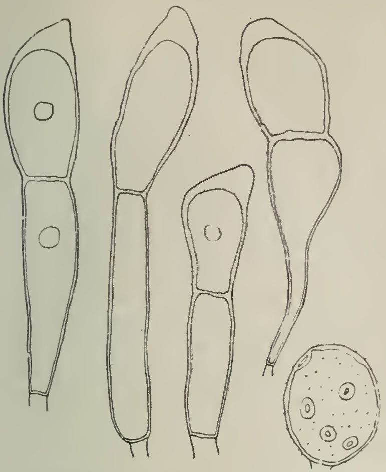
[*] Continued from Journ. Bot. 1913, p. 46.



Puccinia longissima. Spores × 500.

On *Koeleria cristata*, in two localities near Aberdeen, Sept. 20, 1916 (Prof. Trail).

There are often five bordered pores visible on one face of a uredo-spore, or as many as four round the margin. This is the British Uredine which has hitherto been put doubtfully under *P. paliformis* Fckl., but it is certainly not that species (which after all may not be anything but *P. Caricis*). It may not be identical in every respect with *P. longissima*, as described by Bubák, which was on *K. gracilis* and had its æcidia on *Sedum*. But it is at any rate very closely allied to that species as is shown by the remarkable and unusual length of the teleutospores, from which it derives its name. I take this opportunity, which I owe to the kindness of Mr. A. D. Cotton who communicated the specimens, of furnishing accurate figures from the new gathering, made while it was still fresh. Some of the spores were like those figured in my *Rust Fungi* (fig. 217); these are not reproduced here, but far more were like the figures now given. Professor Trail is to be congratulated on his success in having cleared up so far the identity of his previous find which dated so long ago as 1883.

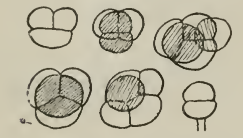
CHRYSOMYXA RHODODENDRI De By. This Uredine was first discovered in Britain by Mr. D. A. Boyd, who found the uredospores on leaves of *Rhododendron hirsutum* at Douglas Castle, Lanarkshire, in June, 1913. He afterwards found the teleutospores.

The æcidium-stage was first found by Dr. Borthwick on the Spruce (*Picea excelsa*) in S.W. Scotland in 1913 (see Trans. Bot. Soc. Edinb. 1914, p. xxxiii), and afterwards by Prof. Trail in Aberdeenshire, Sept. 1916, where it was becoming a danger to Spruce plantations in several places. The white inflated peridia, arranged in two longitudinal rows, one on each side of the mid-rib, on the underside of the leaves, render the æcidium very conspicuous. This parasite was evidently introduced into Britain only a few years ago, and since neither the Spruce nor the Rhododendron can be suppressed it is not easy to see how to prevent its spreading. It is very common in Switzerland wherever the Alpine Roses and the Spruce occur together.

STEMPHYLIUM MACROSPOROIDEUM (Berk.) Sacc. Mycelium creeping, very slender, colourless. Conidia on short erect colourless pedicels, at first 1-celled and colourless, then 2- or 3-celled, pale brownish, afterwards brown and 4-celled, roundish, 16–20 μ diam., the cells cruciately arranged, finally possessing 5, 6 or more cells and becoming rather irregular.

On a plaster-of-Paris disc, on which *Saccharomyces* had been grown for sporulation, *W. J. Hodgetts.*

The *Stemphylium* grew among the *Saccharomyces* probably by aid of the small amount of nutrient fluid which had been placed upon the disc with the Yeast. When the spores reached the 4-celled stage, the cells were at first cruciately arranged, exactly like the tetraspores of *Gracilaria*, but soon they became slightly altered in pose and assumed a perfect tetrahedral grouping as at *a*: most of the spores were in this state, but a few produced one or more additional septa, so as to present a certain resemblance to a Mulberry, as Berkeley noted.



Stemphylium macrosporoidium.
Spores × 500.

This very uncommon fungus was so badly figured by Cooke in the "Handbook" (*Epochnium macrosporoidium*, fig. 293) that it is thought advisable to give accurate figures of the spores here.

ASPERGILLUS FUMIGATUS Fres. Specimens of this fungus, which causes disease in human beings, have been sent to me by Mr. J. W. H. Johnson from Yorkshire, where it has occurred in connection with the water-supply of the rivers.

ZYGODESMUS FULVUS Sacc. In Journ. Bot. 1912, p. 17, I recorded this species, with doubt, from Yorkshire. The doubt was founded on two facts, (1) I could find no clamp-connections, (2) the conidia seemed to be always terminal and frequently in fours; the colour also was rather pale ochraceous than golden-tawny, but that might be due to fading. Since then I have received from Dr. J. S. Bayliss Elliott a beautiful specimen (from Lyndhurst, Hants) exactly agreeing with Saccardo's description, and undoubtedly the true species; it has abundant clamp-connections and the spores appear to be mostly lateral. It presents, however, one peculiar feature—the hyphæ are in many cases glued together in fascicles of about 3–6 after the style of *Coremium.*

HEREFORDSHIRE MYCETOZOA.

By Norman G. Hadden.

So little appears to be known of the distribution of Mycetozoa in the West of England that a list of the species hitherto recorded from the county of Hereford may prove of some interest. Apparently no resident in the county has taken more than a passing interest in the group; most of the records quoted below were made during the Hereford Foray of the British Mycological Society in 1902, others by Mr. Carleton Rea (included in his list in the 'Victoria County History'), and the remainder by myself during four years' residence on the Worcestershire side of the Malvern Hills which separate that county from Herefordshire. The only parts of the county which I have worked at all systematically are the West Malvern and Colwall districts; the great woods of Stoke Edith, Fawley, and other districts appear to have been unexplored as regards Mycetozoa, but they should yield a rich harvest. Although the following list is not a long one compared with those of better worked counties, it will be found to include several very interesting and uncommon species:—

Ceratiomyxa fruticulosa Macbride. Holme Lacy, Dinmore, Whitfield (V.C.H.). West Malvern. Colwall.

Badhamia utricularis Berk. West Malvern. Colwall. Sometimes in great abundance on old logs.

Physarum viride Pers. British Camp. West Malvern. Colwall. v. *aurantium* Lister. Purlieu Lane, Colwall.—*P. nutans* Pers. Haywood Forest, Eastnor, Brockhampton (V.C.H.). Abundant about West Malvern. Subsp. *leucophæum* Lister. Haywood Forest, Moccas (V.C.H.). West Malvern. Colwall.—*P. compressum* Alb. & Schw. West Malvern.—*P. sinuosum* Wein. Hereford foray Brit. Myc. Soc. 1902 (V.C.H.). West Malvern. Bosbury.

Fuligo septica Gmel. Stoke Edith, Holme Lacy, Credenhill (V.C.H.). Mathon. West Malvern.

Craterium pedunculatum Trent. Dinmore, Downton and Whitfield (V.C.H.). West Malvern. Colwall.—*C. leucocephalum* Ditm. West Malvern.

Leocarpus fragilis Rost. Foxley, Dinmore, Holme Lacy, Eastnor and West Malvern (V.C.H.).

Diderma spumarioides Rost. Hereford foray, 1902 (V.C.H.). West Malvern. Colwall.—*D. effusum* Morgan. Purlieu Lane, Colwall, 1914.—*D. Trevelyani* Rost. West Malvern; large gatherings in January and February 1913 and in April 1914. A rare and very beautiful species when mature.—*D. radiatum* Rost. West Malvern, Nov. 1911 and Jan. 1913.

Didymium difforme Duby. Whitfield, Dinmore, Holme Lacy, Eastnor (V.C.H.). Wind's Point. West Malvern, abundant on hedge clippings etc.—*D. clavus* Rost. West Malvern.—*D. melanospermum* Macbr. Hackett's Wood, Colwall.—*D. nigripes* Fries. West Malvern.—*D. squamulosum* Fries. Downton (V.C.H.). Abundant in the West Malvern district.

Mucilago spongiosa Morgan. Rotherwas, Moccas, Whitfield (V.C.H.). Brock Hill, Colwall.

Colloderma oculatum G. Lister. Brock Hill, Colwall and in larch-wood by Jubilee Drive near British Camp.

Stemonitis fusca Roth. Haywood Forest, Dinmore, Whitfield (V.C.H.). West Malvern. Colwall.

Comatricha nigra Schroet. Dinmore, Eastnor (V.C.H.). West Malvern. Colwall. Abundant.—*C. laxa* Rost. West Malvern, July 1914. This appears to be a rare species in the Midlands, though common in Devon and Somerset.—*C. typhoides* Rost. Purlieu Lane, Colwall.—*C. pulchella* Rost. v. *fusca* Lister. West Malvern, 1911: v. *tenerrima* Lister. Brock Hill, Colwall.—*C. rubens* Lister. Colwall 1911. West Malvern, 1914, an abundant development of this rather scarce species.

Enerthenema papillata Rost. West Malvern. Colwall.

Lamproderma scintillans Morg. West Malvern. Bosbury.—*L. columbinum* Rost. West Malvern, Nov. 1913.—*L. violaceum* Rost. West Malvern.

Echinostelium minutum de Bary. Hereford Foray of British Mycological Society 1902, when it was obtained by Miss A. Lorrain Smith; this was the first record of this minute species for Britain.

Brefeldia maxima Rost. West Malvern, Nov. 1913. A quantity of the cream-coloured plasmodium was found on rotten wood and matured indoors.

Lindbladia effusa Rost. Lyonshall (V.C.H.).

Cribraria argillacea Pers. West Malvern.

Dictydium cancellatum Macbr. West Malvern.

Tubifera ferruginosa Gmel. Brockhampton (V.C.H.).

Dictydiæthalium plumbeum Rost. Belmont (V.C.H.).

Enteridium olivaceum Ehrenb. Near British Camp, 1914.

Reticularia lycoperdon Bull. Dinmore, Holme Lacy, Whitfield, Eastnor, Colwall (V.C.H.). West Malvern.

Lycogala epidendrum Fries. Credenhill, Downton, Eastnor, Whitfield, Brockhampton (V.C.H.). West Malvern.

Trichia affinis de Bary. West Malvern.—*T. persimilis* Karst. Hereford, Eastnor, Brockhampton (V.C.H.). West Malvern. Colwall.—*T. varia* Pers. Downton, Dinmore (V.C.H.). West Malvern.—*T. decipiens* Macbr. Holme Lacy, Stoke Edith (V.C.H.). West Malvern. Colwall. Eastnor.—*T. contorta* Rost. West Malvern. Colwall.—*T. botrytis* Pers. Whitfield (V.C.H.). Colwall. West Malvern.

Hemitrichia vesparium Macbr. and *H. clavata* Rost. Colwall.

Arcyria cinerea Pers. West Malvern. A yellow form at Brock Hill, Colwall, 1914.—*A. denudata* Sheldon. Credenhill, Dinmore, Eastnor, Brockhampton, Whitfield, Stoke Edith (V.C.H.). Colwall. West Malvern.—*A. incarnata* Pers. West Malvern. Colwall. Very plentiful, doubtless it occurs throughout the county.—*A. nutans* Grev. Downton, Colwall (V.C.H.). West Malvern.

Perichæna corticalis Rost. Dinmore (V.C.H.). West Malvern. Colwall.

Dianema depressum Lister. West Malvern; rather frequent.

Prototrichia flagellifera Rost. West Malvern, April 1914. A small gathering on old Clematis stems.

SHORT NOTES.

Carex pseudo-paradoxa S. Gibson (p. 113). It is not my wish to enter upon such lengthy arguments as filled the pages of the *Phytologist* in 1842–44, but Mr. Bickham's interesting note seems to call for some few words in defence ot my original remarks. I must admit that the production of an undoubted example of *teretiuscula* named *pseudo-paradoxa* by Gibson seems a strong point, but with specimens there is always the possibility of confusion or even mis-labelling; with descriptions one is not so likely to be misled. How can we place any *teretiuscula* form under Gibson's diagnosis of the plant which he first described as a variety of that species, but subsequently named *C. pseudo-paradoxa*—"fruit agreeing with Leighton's figure of the fruit of *C. paniculata*" (Phytol. i. 366, 1842), and stem "that has three acute angles, with the insterstices flat, or, if I were to speak with exactness, I might say the interstices are concave." (op. cit. 1043, 1844)? Again, Gibson says that his plant also grows plentifully by the sides of the Malham tarn" (op. cit. 779, 1843); has anyone seen *C. teretiuscula* there? Luxford (op. cit. 896, 1844) remarks—"I was somewhat surprised to learn from Mr. Sidebotham that some of his botanical friends, as well as himself, considered the plant to be the *C. paradoxa* Willd."; I do not imagine Mr. Sidebotham would have said this of *teretiuscula*, but I may say I fell into the same error myself respecting the Forfarshire plant and quite thought, at first, it was the true plant of Willdenow. I suggest that the solution of the matter *may* be found in the words of Mr. Bickham when he says, "in deeper water [grow] small tufts of *C. paniculata*, very inferior to those frequently found in Cheshire Meres and therefore not generally gathered for specimens." These "inferior" examples may have been identical with those *originally* sent Gibson and from which he drew up the diagnosis of his new species; then later, other specimens, possibly mixed with *teretiuscula*, may have been sent him later, all labelled as the new plant and distributed. No other explanation, to meet the difficulty, suggests itself to me,—C. E. Salmon.

Epilobium hirsutum × palustre in S. Devon. Mr. W. P. Hiern has kindly sent me the Eighth Report (1916) of the Devon Botanical Committee. This hybrid, now known for three English vice-counties, is there recorded from Alphington, v. c. 3, in the Exeter district; likewise *E. hirsutum × parviflorum*, from Sowton, in the Honiton District.—Edward S. Marshall.

REVIEW.

The Principles of Plant Teratology. By W. C. Worsdell, F.L.S. Vol. ii, 8vo, pp. xvi, 296, figs. 61–155, Plates 26–53. Ray Society, 1916. Price 25*s*. net.

The earlier volume of Mr. Wordsell's work, which was noticed in last year's Journal (p. 149), dealt with the non-vascular plants and the vegetative organs of the vascular plants. The second volume, which completes the work, deals with the flower. The author uses the term "flower" to include all specially modified portions of the axis on which sporophylls and accessory organs are aggregated for purposes of reproduction, and considers under this head abnormal structures affecting not only the "flower" of angiosperms but also the "cones" of gymnosperms and vascular cryptogams and the sporophylls of ferns.

The subject-matter is arranged under three main sections:—differentiation, simplification and adventitious flowers. Under the first head are grouped the phenomena of proliferation; forking and fasciation; disruption—a term employed to describe the splitting of the maize-cob, a female inflorescence, into its primitive constituents or branches, which have become fused together in the normal cob, the result is a paniculate inflorescence resembling the male—; positive dédoublement, including polyphylly, an increase in the number of members of a whorl and pleiotaxy, an increase in the number of whorls; dialysis—the dissociation of members belonging to the same or different whorls; and metamorphosis. The chapter on metamorphosis occupies more than one third of the volume. The view is adopted that the "flower" has been evolved from an elongated leafy shoot, with the "cone" as an intermediate stage; the pteridosperm-cycad phylum supplies an objective case, the shoot becomes congested and the leaf-like sporophylls become reduced and simplified to the modern cycad-sporophylls, and crowded in spirals or whorls on the shortened axis. "If this is true of the flowers and cones of the Cycads, it must be equally true of the very similarly organized flowers of the Angiosperms." Under metamorphosis are considered the phenomena of phyllody (also known as chloranthy), or the change of floral leaves into leaf-like structures, as in the green rose; squamody and bracteody, or a change into scales or bracts; sepalody; petalody; zygomorphy, a change from a radiate to a bilateral symmetry; pelory; staminody; carpellody and sporangiody. These phenomena are considered under the headings of the different organs affected, namely, calyx, corolla, andrœcium, gynœcium, and the sporophylls of cryptogams.

The section on simplification, a comparatively short one, includes (1) the abbreviation of the inflorescence and flower—that is, the opposite condition to proliferation; (2) adnation of floral axes, either with each other or with floral leaves, or of floral leaves with each other; (3) cohesion, such as synanthy or the union of entire flowers; and (4) suppression.

Adventitious flowers are rare. Reference is made to a few cases of flowers arising in the position of ovules, and the remarkable case of the Nepaul barley is described.

Throughout the volume numerous examples are described and illustrated and their morphology and its bearing on general principles is discussed from the author's point of view as enunciated in the introduction to the first volume. The second like the earlier volume is profusely illustrated and some of the plates are in colour.

While botanists may differ from Mr. Worsdell's views on abstract morphology, they will be grateful for this classified arrangement and description of a large series of plant abnormalities. *The Principles of Plant Teratology* will hold an important place among botanical books of reference.

A. B. R.

BOOK-NOTES, NEWS, ETC.

A COMMUNICATION by Professor Weiss to the *Manchester Guardian* of March 29 announces that Mr. Charles Bailey has presented his herbarium to the Manchester University. Prof. Weiss writes: "The acquisition of this superb collection added to the existing herbarium of the Manchester Museum, and more particularly to the large and valuable collection of non-European plants presented to the University in 1904 by Mr. Cosmo Melvill when he retired from business in Manchester, places Manchester among the foremost of British institutions in respect of this necessary instrument of botanical study and research. In a communication which Mr. Bailey made last Tuesday to the Manchester Literary and Philosophical Society, he mentions that the foundations of his herbarium were 'laid more than sixty years ago, in the dingy lecture-room of the late Professor W. C. Williamson, in the old Owens College in Quay Street, and it is fitting that it should revert to the University of which Owens College was the forerunner.' It is equally appropriate that the vast collection which has been brought together by the enterprise and assiduity of a Manchester business man should permanently enrich the city of which he was a prominent and active citizen. His long and intimate connection with the scientific interests of Manchester, both as treasurer of the Literary and Philosophical Society and as president of the Manchester Field Club, and the charm of his personality, have endeared him to a long line of botanical students, and this last generous gift to the University of Manchester is a fitting climax to a lifetime in which he devoted so much thought and all his wonderful methodical energy to the building up of what is at present undoubtedly the finest private herbarium in Britain. The comprehensiveness of his collection may be gathered from the fact that the British portion contains no less than 87,000 separate sheets of mounted plants, while the European portion amounts to 295,000 sheets. Mr. Bailey has made generous provision for the cost of transference of his herbarium to Manchester, and also towards the expenses of completing the mounting of the specimens, so that it may be available for study and reference." An inspection of the list of the principal contents of the herbarium which Mr. Bailey has been so kind as to send us shows that these include the principal European and Oriental collections distributed during the last fifty years, as well as numerous British herbaria of interest. Among the latter may be mentioned Andrews's Saxifrages and the plants of De Crespigny, H. S. Fisher, John Hardy, J. Harbord Lewis, F. T. Mott, W. L. Notcutt, and James Ward, besides such sets as have from time to time been published. The herbarium has been most carefully preserved and is admirably arranged: with such a foundation Manchester can hardly fail to become the most important botanical centre for the north of England.

AT the meeting of the General Organizing Committee of the Fourth International Botanical Congress, held at the rooms of the Linnean Society on February 15th, Lt.-Col. Sir David Prain, C.M.G., presiding, the Secretary (Dr. Rendle) stated that as the proposed London Congress of 1915 had not been held the initiative for deciding the date and place of the next Congress rested with the Association

Internationale des Botanistes, and therefore the present committtee had no longer any status. He then suggested the possibility of holding a Botanical Congress on somewhat different lines after the declaration of peace; this might perhaps take the form of an Imperial Congress. The Treasurer stated that the unexpended balance of the funds collected for the local expenses might be used for the purpose of another Congress provided the consent of the subscribers was obtained. The following resolutions were then passed:—

(1) That the Organizing Committee be forthwith dissolved and that the Members thereof become Members of a new Organizing Committee with a view to considering after the declaration of peace proposals for further action in regard to holding a Botanical Congress.

(2) That the Members of the former Executive Committee are hereby appointed the Executive Committee of this Committee as now reconstituted, and that such Executive Committee be instructed at the proper time to submit to this Committee such proposals and suggestions as they may consider desirable in regard to the holding of a Botanical Congress.

(3) That the subscribers to the fund for the International Botanical Congress of 1915 be invited to allow the balance of their subscriptions unexpended (and subject to the discharge of any outstanding liabilities) to be handed to the new Executive Committee in furtherance of the above objects.

At the meeting of the Linnean Society on March 15, Dr. R. R. Gates, F.L.S., read a paper entitled "A Systematic Study of the North American *Melanthaceæ* from the Genetic Standpoint." His assumption, based upon experiment during the last fifteen years, is that the variations which mark species have not been universally continuous and infinitesimal, but often definite and discontinuous. Definite variation is not necessarily orthogenetic variation, but marked variation which may occur in any, or in many, directions simultaneously. The experience gained in work on the mutations in *Œnothera* is turned to account in this group of Liliales which has not hitherto been the subject of experiment. Pairs of species have been taken and investigated on this basis. Related genera showing marked differences in structure often co-exist side by side, showing that these differences cannot be claimed as of selective value, but have arisen from "spontaneous variation" and have been perpetuated by heredity.

Two parts, costing a shilling each, of the Natural History Report of the British Antarctic ("Terra Nova") Expedition of 1910 have been issued by the British Museum (Natural History), containing the Algæ. Part I. contains the Freshwater Algæ by Dr. Fritsch; this includes a very full account of *Prasiola crispa*, which grows in great abundance at Cape Adare and descriptions of two new species—*Phormidium Priestleyi* and *Schizothrix antarctica*: these and other forms are figured on an accompanying plate. Part II. includes the Marine Algæ, by Mr. and Mrs. Gepp, in the course of which a plant described and figured by them as *Floridea* in this Journal for 1905 (p. 193, t. 472) is identified with *Curdiea Racovitzæ* Hariot: the *Melobesieæ* are by Madame Paul Lemoine, who describes and figures two new species—*Lithothamnium Geppii* and *L. trinidadense*.

A RECENT addition to the innumerable books dealing in a popular manner with our native flora is *British Wild Flowers, their Haunts and Associations*, by William Graveson (Headley Brothers, 7*s.* 6*d.* net). It is a favourable specimen of its class: looking it through, we note no serious errors, such faults as there are being of omission rather than of commission—we sometimes desiderate more information about individual species. Its main plan is to describe a series of rambles arranged according to the seasons of the year: Mr. Graveson has a very pleasing style, well calculated to interest the reader, and is evidently a keen observer: books of this kind are so often mere compilations that it is refreshing to come across one which represents first-hand knowledge. The plants are referred to almost entirely by their English names, unfortunately without their Latin equivalents which however may be found in the monthly floral calendar, wherein much information is given, but oddly enough, no reference to the pages wherein the plants are described. There are numerous very pretty and accurate, if somewhat feeble, illustrations, some of them coloured, by Mr. J. Wood of the Hertford School of Art, and some of the best reproductions from photographs we have ever seen by Mr. A. V. Elsden of the same place, whence the author also hails. One funny mistake runs through the book: the little volume on *The Folk-lore of Plants* by the Rev. T. F. Dyer is attributed to "Sir T. F. Thiselton Dyer"—evidently through some confusion with the late Director of Kew Gardens, who will hardly feel flattered by being associated with a by no means excellent compilation.

THE memoir of Daniel Oliver published in our last issue should have contained some reference to the complete bibliography which appears in the *Kew Bulletin*, 1917, no. 1, pp. 32–36.

TO OUR READERS.

IN our issue for December last we called attention to the serious financial crisis which the Journal was undergoing, and expressed a doubt whether, in face of financial loss, it would be possible to continue its publication. The reluctance to abandon an undertaking which had been carried on without interruption for thirty-eight years induced us however to continue the issue for at least another year, in spite of our expressed foreboding that there would be an obvious deficit on the 1916 volume. That foreboding was, unfortunately, more than realized; when the account from the printers was sent in, towards the end of February, it showed a balance on the wrong side of nearly £50. It was then too late to consider discontinuance, and we ventured, with some hesitation, to place the matter before the friends who, as stated in the December issue, had defrayed the comparatively small deficit on the volume for 1915.

Their generous response, the more gratifying on account of the kind words with which it was accompanied, relieved us to a great extent from the anxiety which we naturally felt. But their kindness did not stop here: a circular was drawn up, signed by five of them, addressed to those who, it was thought, might be willing to co-operate in supporting the Journal; and the response was such as to remove the deficit entirely and to leave a balance towards carrying on the

Journal for the current year. This result was the more satisfactory because the notice in December, although it elicited several expressions of hope that the Journal would be continued, produced from British botanists no substantial help towards that end—indeed the only financial assisstance then received came from Dr. N. L. Britton, of the New York Botanical Garden, who sent, with a kind letter, a cheque towards the expenses for 1917. We desire to express our thanks to those who have responded to the appeal, and especially to the one who undertook the work of preparing and circulating it and receiving donations, whose name, at his own request, we do not mention.

Though we are thus relieved from debt, the future must continue to give cause for anxiety. The list of subscribers, never large, has suffered diminution through various causes, the War being one; and the losses thus incurred are not replaced by new supporters. A few, however, have been secured, and it is felt that the list might be further increased if those interested in the Journal would use their influence to obtain additions to the list. The number of local Natural History Societies which subscribe might, we think, be increased without difficulty, if botanists connected with them would take the matter in hand.

One or two of the responses to the appeal took the form of suggestion or criticism: it was thought, for example, that a greater variety of subjects might be discussed in the Journal. We have always been conscious of our shortcomings, but so far as this particular matter is concerned, the remedy rests with our contributors. It is very rarely that any communication is refused insertion, and although we have no difficulty in filling our space, we seldom have more than enough (with due foresight for the future) for that purpose. We feel especially that brief communications, such as those which appear under the heading "Short Notes," might easily be multiplied; and these are to many one of the most interesting features. Curiously enough, we have at the present moment more contributions in hand than is usual; so that so far as matter goes, the Journal is well supplied.

We are however always grateful for suggestions and are prepared (so far as is possible) to act on them. One such, which we propose to adopt at once, is that the Journal should become a medium for the sale or exchange of books; a space on the cover will be set aside for this, the charge for insertion being 1*s.* 6*d.* for the first two lines and 6*d.* per line after.

In conclusion we would say that the strictest economy will be needed, if this Journal is to be maintained. It will be impossible to illustrate papers either by plates or figures, unless the authors are willing to pay for the production of these; and the supplements which have hitherto appeared from time to time will have to be abandoned or curtailed, until happier times prevail. We shall also be unable to supply authors with the six copies of their contributions which have hitherto been sent free of charge: such copies, or as many as required, will be supplied by the publishers at the rates mentioned on p. 2 of wrapper. Meanwhile we can assure our subscribers that no effort on our part will be wanting which may render the Journal more worthy of their support. THE EDITOR.

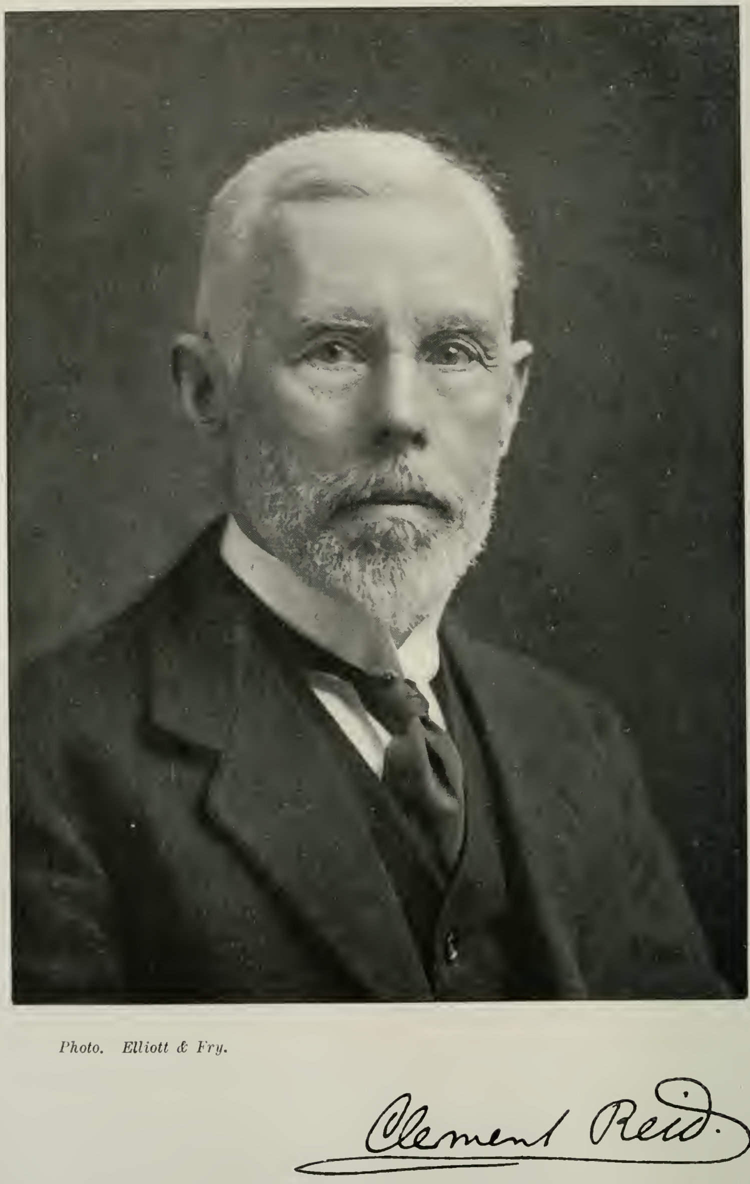


Photo. Elliott & Fry.

Clement Reid.

CLEMENT REID, F.R.S.

1853–1916.

By James Groves, F.L.S.

(With portrait.)

By the death of Clement Reid we have lost not only a distinguished geologist, but one whose botanical knowledge and attainments in his own particular department were unique. For many years prior to his retirement from official life, his cheery, genial, energetic personality was a familiar one at the Linnean and Geological Societies, the British Association and the many other places of meeting of the votaries of Natural Science.

Clement Reid was born on the 6th Jan., 1853. Mrs. Reid has kindly furnished me with the following particulars with regard to his early life.

"His father was Edward Ker Reid, a London goldsmith, and his mother a niece of Michael Faraday, a relationship which had a marked effect upon his life. The influence of the great scientific spirit of Faraday permeated the whole surroundings of his childhood, and gave encouragement to the natural bent of his mind. From his mother he inherited a great love of nature, especially of flowers. This love stood him in good stead in childhood, when for some years he was deaf from the after effects of scarlet fever, and being unable to join in play with other children, was compelled to seek special interests of his own. These he found in long solitary rambles about the neighbourhood of North London. It was during these rambles he laid the foundations of his scientific knowledge, and trained his powers of observation. He owed little to school training, for a large family and rather small means compelled his parents to curtail his schooling at an early age, and at 14 he was entered in a publisher's office. He greatly disliked the work, though in after years he appreciated the value of a business training, and when after seven years he heard through his friend Mr. H. B. Woodward of the likelihood of a vacancy on the Geological Survey, he determined to throw up his work and devote himself to qualifying for the Survey appointment. He was successful in obtaining this, his appointment dating from 1874.

"For a man with his great love of nature, the life of the Geological Survey was an ideal one. The long solitary walks and days in the open were his delight, as they had been in childhood. He used to say it was when walking that ideas flashed into his mind. And through his knowledge and observation of the present world he learned to interpret the past. He was essentially a naturalist, and it was from the standpoint of a naturalist he regarded geology. The geological world he looked upon was a *living* world, a world of many aspects but of an essential unity. He held that to form a true judgement of past causes and conditions it was necessary to gather and weigh evidence from as many sources as possible. He was impatient of a well-rounded theory which refused to have regard to adverse facts, and his natural truthfulness of mind compelled him to state discrepancies rather than ignore them, in the hope that wider knowledge might reconcile seeming contradictions."

In an appreciative notice in the *Geological Magazine* for January, his friend and former colleague Mr. E. T. Newton, F.R.S., traces his official career. He tells us that Reid was in the first instance stationed in the south-west of England, but was soon afterwards transferred to the Eastern counties, where he remained for some years. It was during this period that the exploration of the Cromer Forest Bed, with its wealth of vegetable remains, led him to take up the principal study of his life—the indications afforded by fossil plants of the changes in the climate and physical configuration of our country during more recent geological times. His first paper appears to have been that contributed to the *Geological Magazine* in 1877 on "Modern denudation in Norfolk." From that time forward, Reid's contributions to Geology and recent palæo-botany were continuous. Some idea of his extraordinary intellectual activity may be gained from the fact that the published notes, papers and books either written by himself, or to which he made important contributions, total up to considerably over a hundred. The most important of those dealing with the botanical side of his work only, can be referred to here.

In 1880 he wrote a paper on the Glacial deposits of Cromer*, but in this only two plants are mentioned. This was followed in 1882 by his "Geology of the Country around Cromer" †, which contained a list of 38 plants, in 1884 by a paper on "Recent additions to the Fauna and Flora of the Cromer Forest Bed' ‡, and in 1886 by a general paper on that Flora § in which the total was brought up to fifty-five species. In 1888 in conjunction with Mr. H. N. Ridley he gave an account of the "Fossil Arctic plants from the lacustrine deposit at Hoxne in Suffolk" ‖. In the same year he contributed his first general paper on the fossil flora of this country, entitled "Notes on the Geological History of the Recent Flora of Britain" ¶ in which 120 species were referred to. His memoir in 1890 on "The Pliocene Deposits of Britain" ** added to the number.

In 1892 he published his very interesting little paper "On the natural history of isolated ponds" †† dealing mainly with the problems of distribution and the causes of dispersal, which had always a great fascination for him.

In the same year he published papers on "Fossil Arctic plants found near Edinburgh" ‡‡, "On the Climate of Europe during the Glacial epoch" §§, and "On the Pleistocene deposits of the Sussex Coast and their equivalents in other districts" ‖‖. In the last-mentioned paper he discussed the evidence in favour of there having been an inter-glacial period when the climate was mild, as shown by the remains which had been found of a large number of plants belonging to a temperate flora, some of which could not have borne extreme cold. In several of his subsequent papers * further evidence was adduced from the examination of deposits from different parts of the country in support of this theory, which he regarded as conclusively proved. In 1897 he produced a paper on "Pleistocene plants from Casewick, Shacklewell and Grays" †.

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* Geolog. Mag. II. vii. p. 55. † Mem. Geolog. Survey.

‡ Trans. Norfolk & Norwich Nat. Soc. iii. p. 631. § Ibid. iv. p. 189.

‖ Geolog. Mag. III. v. p. 441. ¶ Annals of Botany. ii. p. 177.

** Mem. Geolog. Survey. †† Trans. Norf. & Norw. Nat. Soc. v. p. 272.

‡‡ Rep. Brit. Assoc. p. 716. §§ Nat. Science, i. p. 427.

‖‖ Quart. Journ. Geolog. Soc. xlviii. p. 344.

In the latter year he married Miss Eleanor Mary Wynne-Edwards, and it was with that lady's able assistance and co-operation that most of his subsequent work at fossil plants was accomplished. Immense quantities of "matrix," sometimes actually amounting to hundredweights, were dealt with by their united efforts, being washed and treated by various methods, and subjected to such careful examination as to insure that minute, often almost microscopic, organisms, should not escape notice.

In connection with his earlier work Reid had experienced great difficulty in obtaining, for comparison with the fossils, examples of recent fruits and seeds, even of British plants, finding the public herbaria woefully deficient in this respect. He therefore set himself to form a collection, and in so doing obtained not only a much extended acquaintance with our native plants but an unequalled knowledge of their seeds and fruits. His official duties necessitating lengthened sojourns and exhaustive exploration of the countryside in many different districts in England afforded exceptional advantages, and in this way he came closely in touch with such diverse floras as those of East Norfolk and Cornwall, the N.E. Yorkshire Moors, and the Channel counties.

In order to identify the fossils, especially in the later deposits dealt with, it became necessary not only to be acquainted with the plants of Europe but practically of those of the world, for in some of the deposits the remains were found to correspond with plants from very distant parts. In this branch of the work Mrs. Reid was able to afford very material assistance, working for a long time at Kew, examining and making drawings of fruits and seeds etc. to supplement the collection already accumulated.

In 1898 Reid described *Limnocarpus*, a new (fossil) genus of Naiadaceæ ‡, and the same year contributed a paper on "Further contributions to the geological history of the British Flora §," in which 240 species were enumerated with a full tabulated statement of the deposits and districts from which they had been obtained.

In 1899 he published his first book, apart from various memoirs of the Geological Survey for which he was responsible. This—*The Origin of the British Flora*—though a thin volume of less than 200 pages, was a very important work, dealing in a masterly way with the means of dispersal of plants generally, and the changes in the geography and climate of this part of Europe, from the newer Pliocene period onward. It also enumerated the results of the author's many years of patient research, in the shape of lists of the species of plants found in the various deposits with the conclusions drawn therefrom. The latter half of the book consists of a systematic account of the history of our present flora as indicated by the geological evidence.

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* "A Fossiliferous Pleistocene Deposit at Stone on the Hampshire coast," Q. J. G. S. xlix. (1893); "Further notes on the Arctic and Palæolithic Deposits at Hoxne", (by C. R. & H. N. Ridley), and Brit. Ass. Rept. 1895; "The Relation of Palæolithic man to the Glacial Period", Brit. Ass. Rep. 1896; "The Palæolithic Deposit at Hitchin," Proc. R. S. lxi.

† Quart. Journ. Geolog. Soc. liii. p. 463.

‡ Journ. Linn. Soc. xxxiii. p. 464.

§ Annals of Botany, xii. p. 243.

In 1901 and 1903 he published notes on the plant remains of Roman Silchester*, and in the latter year "Notes on the seeds of plants found in the alluvium of the River Lea at Walthamstow" †. In 1902 he contributed the article "Palæo-botany, Tertiary" to the *Times* edition of the *Encyclopædia Britannica*; this article slightly revised appears in the current edition.

In 1905 he visited Tegelen in Holland, where some interesting fossil plant-remains had been found in a bed of brick-earth, judged to be about contemporaneous with the Cromer Forest Bed. In 1907 he and Mrs. Reid published the result of their work on the material obtained there in a fine memoir, "The Fossil Flora of Tegelen sur Meuse" ‡, followed in 1908 by a paper on *Dulichium vespiforme*, a new species §, and in 1910 by "A further investigation of the pliocene Flora of Tegelen" ‖. These three papers are illustrated with numerous admirable micro-photographs of the seeds etc. by the authors. In the course of this investigation startling results were obtained. Eastern Asiatic types being found in company with the ordinary European plants of to-day.

In 1907, while Reid was stationed in North Cornwall, he had a visit from Professor Nathorst the eminent Swedish palæo-botanist, whose work he much admired and for whom he had a great personal regard. This visit afforded the opportunity for discussing and comparing notes on the problems connected with recent geological changes in which both were so much interested.

In 1908 the Reids produced an important paper on the Pre-Glacial Flora of Britain ¶, in which 151 species were enumerated, the illustrations being still better than those of the Tegelen papers. In 1910 they contributed an illustrated paper on 'The Lignite of Bovey-Tracey **, dealing with the plants of a much earlier period, and in this several new species were described.

In 1908 Reid went out to Cyprus on behalf of the Colonial Office to report on the water supply, and made a small collection of plants, which was worked out at Kew. In 1911, at the British Association meeting at Portsmouth, he read a paper and opened a discussion on

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* Archæologia, lvii. & lviii.
† Essex Naturalist, Oct. 1903.
‡ Verhandl. Kon. Akad. Wetens. Amsterdam, xiii.
§ Verslag Kon. Akad. Wetens. Amsterdam, 1908. p. 898.
‖ Ibid. 1910, p. 192.
¶ Journ. Linn. Soc. xxxviii. p. 206.
** Phil. Trans. Royal Soc. B. cci. p. 161.

"The Relation of the present Plant Population of the British Isles to the Glacial Period," reprinted in *The Naturalist*, 1911 (p. 373).

In January 1913, at the age of sixty, he retired from official life. Some years previously, in anticipation of his retirement, he had bought an acre of land in a beautiful little valley, close to the coast and by the side of a pine wood, near the village of Milford-on-Sea, South Hants. Here he built himself a charming house which he christened "One Acre," situated within about ten minutes' walk of the famous Hordle Cliffs with their fine exposure of Lower Headon Beds. He took a great delight in laying out the garden, in which he grew many interesting plants, especially those belonging to genera found as fossils.

In 1913 he published *Submerged Forests*, a small 8vo volume dealing principally with the changes of level which have taken place in this country during post-glacial times as evidenced by the submerged forests found at different depths around the coast, and the various problems connected therewith.

In 1914 Mr. and Mrs. Reid contributed a paper to this Journal on "A new fossil Corema," the fruits of which they had found in Eastern county deposits and more recently in Holland. They had been working for some time on the rich deposits of Pliocene plant-remains discovered at Limburg in Holland, and in an adjacent locality over the German frontier. In 1915 they published the results of this investigation in the shape of a magnificent large-quarto monograph entitled *The Pliocene Floras of the Dutch Prussian Border*, which was brought out by the Institution for Geological exploration of the Netherlands. This contained descriptions of a number of new species and was illustrated by twenty excellent plates. The results obtained were of the greatest interest: 189 species are mentioned, and in the case of a large number of them the nearest living representatives are to be found in the Himalayas, China, and Japan.

In 1916 Reid contributed a paper to the *Quarterly Journal of the Geological Society* on "The Plants of the Late Glacial Deposits of the Lea Valley," in which two new species were described: this was in great part reprinted in this Journal for that year (pp. 193–198).

During the last three years of his life the present writer had the privilege of being in very close touch with him. Several pleasant visits were paid to "One Acre," we had fossil hunts together in Hants and Dorset, and there were meetings in London. Our correspondence was frequent and continuous, rarely more than a few days elapsing without a letter passing between us. It came about in this way: in 1913, my attention had been drawn to the curious remains of Characeæ found in the Middle Purbeck Beds of Dorset, and I was attracted to make a study of the early history of the group. Years before, Reid had sent us Chara-fruits from the Cromer Forest Bed for examination, but we had not pursued the matter further. He and I had always been on very friendly terms, and I naturally turned to him for assistance in obtaining specimens and information. He entered into the matter with his usual zest. We borrowed all the specimens we could of the Middle Purbeck cherts, and in the spring of 1914 paid a visit to Durlston Bay to collect more.

Promising as were the specimens we examined, being only visible in section, there were curious points of structure, of which we could not make out the significance, as well as problematic organisms which might prove Characeous. Reid at once decided that the thing to do was to find the same fossils in one of the seams of limestone.

Early the following year he visited a spot on the hills north of Weymouth, where there is an extensive outcrop of these beds, and there found the Chara-remains in great quantity, not only in chert, but also in limestone. He devised an ingenious plan for dealing with the latter. By subjecting thin slices to a continuous drip of slightly acidulated water for many hours, he completely etched out the fossils. We were thus enabled to understand some of the things which had puzzled us in the chert sections, and to arrive at important conclusions as regards the structure of these early Characeæ. We published a preliminary report on the results obtained in the 'Proceedings' (B lxxxix, 1916) of the Royal Society, from whom we had received a small grant to defray the expenses of slicing and polishing. Meanwhile we had also been working together at the Chara-remains from the Hordle Beds, and had prepared material and partly completed a paper on them for the Geological Society, an abstract of which was read before the Society in November last. Reid made a very large number of fine micro-photographs of the specimens from the Purbeck and Headon Beds.

For a great part of his life, he had suffered at times from acute indigestion, and latterly this appears to have seriously affected his heart. When I was at Milford last June it was an effort for him to walk any distance, later on he became rapidly worse, and on the 10th December he passed away. He was buried in Milford Churchyard. His death at the comparatively early age of 63 came as a great shock as well as a disappointment to his friends. When he retired, apparently in full health and vigour, we all hoped that there were many years of active and useful work before him.

In 1875 he was elected F.G.S. and served on the Council of that Society in 1892–5 and in 1912, being appointed a Vice-President in 1913. In 1886 he was elected F.L.S. and served on the Council of that Society in 1900–2 and 1905–7. In 1899 he was elected F.R.S. He received the award of the Murchison Geological Fund in 1886, the Bigsby Gold Medal in 1897, and the Bolitho Gold Medal of the Royal Society of Cornwall in 1911.

The excellent portrait by Messrs. Elliott & Fry here reproduced was taken in 1915.

Among botanists I had perhaps rather exceptional opportunities of judging Reid's personal character. He possessed as it seems to me, in a remarkable degree, just the qualities required for the work he had set himself to do. On the one hand, his patience, his resourcefulness and his untiring energy, qualified him to deal effectively with the vast masses of material from which evidence had to be collected; while his methodical habit of mind enabled him to piece together the facts and correlate and marshal them so as to be available for his purpose. On the other hand, he possessed the constructive imagination, more necessary perhaps in geology than in any other science, which enabled him to bridge over gaps and project theories, while retaining an open mind to modify or reject a hypothesis if subsequent evidence showed that it was not tenable.

He was particularly clever in devising methods for overcoming the difficulties always cropping up in the way of the palæontologist, and I believe that he took a positive delight in grappling with obstacles which would have hindered and perhaps altogether deterred many. His enthusiasm was boundless, and there was always something particularly stimulating in his letters and conversation as if some measure of the restless energy and tremendous driving power of the man communicated itself to those around him. Though he got through enough scientific work to more than fill an ordinary man's life, Reid was never the mere "scientist" for he found time to take an interest in books and in the affairs of the day. He had a large outlook on life and was essentially a public-spirited man.

He was modest as regards his own achievements. Although he felt a natural gratification at the accomplishment of a good piece of work there was no trace of vanity in his disposition. As a "partner" I found him most helpful and generous; more than three-quarters of the work which we did together at the fossil Characeæ was his, yet he would not consent to my taking less than an equal share of the credit.

He was one of the kindest of men, always thoughtful and considerate for others, and no one could work with him without being impressed by his absolute sincerity and singleness of purpose, and feeling the better for the contact with so thorough a naturalist and so courteous and true-hearted a gentleman.

CRITICAL NOTES ON SOME BRITANNIC SAXIFRAGES.

By the Rev. Edward S. Marshall, M.A., F.L.S.

In his *Saxifragëarum Enumeratio* (1821) Haworth divided this genus into several; among which *Robertsonia* is, I believe, the most worthy of those found in our country to rank as such. It is, however, rather too closely related to his *Chondrosea* (incrusted or *Aizoon*-group); and *S. Andrewsii* Harvey is, surely, a natural garden-cross between *S. Aizoon* and *S. umbrosa* (not *S. Geum*, as Engler assumed). Hybridity may, indeed, occur between species of distinct genera, as in the case of many Orchids, both wild and cultivated; but all modern writers appear to have retained the name *Saxifraga* for the greater part of the Linnean genus, *Megasea* being a notable exception.

For a good many years I have paid special attention to our native Saxifrages. Apart from *S. Geum* and *S. umbrosa*, where specific variation is much complicated by numerous hybrids or mongrels, these present no very great difficulty, until the "mossy" group (§ *Dactyloides* Tausch) is reached. This section, however, with the possible exception of *Ranunculus*, § *Batrachium*, is the hardest of all our smaller critical series to disentangle. As far as my own researches are concerned, I write the following remarks with much diffidence;

my task is by no means ended, but it may be worth while, if only in order to reawaken interest and increase field-work, for me to state some of the fairly definite conclusions which have, so far, been reached.

Our early nineteenth century botanists unquestionably knew these plants far better than their successors. It is interesting to trace the gradual increase in Smith's grasp of the subject, from the *Flora Britannica*, through *English Botany*, to his final arrangement in the second volume of the *English Flora* (1828), which was largely influenced by D. Don's Monograph in Trans. Linn. Soc. xiii. 341, &c. (read Feb. 20, 1821); Don's descriptions are very clear and good. Smith quoted Haworth's *Miscellanea Naturalia* (1803), but does not seem to have known his later and better book.

Babington figured some of Don's segregates in Engl. Bot. Supplement, and did useful work; but Syme's treatment, in the third edition, leaves much to be desired, being mainly based on dried material.

Mr. Baker's account in this Journal for 1870 (viii. pp. 280–290) marks a new departure; he had evidently come under the influence of the Bentham school, which discouraged the multiplication of species. Nowadays, the general tendency of students is towards a rather free use of the term; this, I believe, is more true to natural facts, and really more scientific, though it may easily be (and often is) carried too far. Professor Engler's *Monographie* (1872) followed Mr. Baker's lines, in dealing with the Hypnoid group; he was a young man when he wrote it, and does not appear—from internal evidence—to have seen either the Linnean Herbarium or authentic material of our endemic forms. Sir J. D. Hooker, in his *Student's Flora* (3rd and last edition, 1884), adopted much the same plan.

In order to form a sound judgement about the status of a given plant, even the most careful study of types, figures, and descriptions will not suffice. One needs to know it in its wild stations; and a great deal can be learned by cultivation, which allows it to be examined throughout the year, and also illustrates the transient changes due to wet or dry seasons, heavy or light soils, varying aspects, &c. Broadly speaking, I have found that the forms grown in my garden keep surprisingly constant; many of them flower freely, but a few are shy bloomers, and one or two soon died out, owing to unsuitable conditions.

Last year I had an interesting correspondence with Mr. F. N. Williams, which helped us both a good deal. Our opinions (as a rule arrived at independently) agreed in the main, except as to one or two points of nomenclature.

The *London Catalogue* list (tenth edition, 1908) is, I think, too short, taking its average species-rank, or that of the *Cambridge British Flora*, as a standard. The war has hindered my undertaking some hoped-for Irish excursions; but the Galtee Mountains, and several western counties (*e. g.* the limestone glens of Leitrim and Sligo), should add useful data.

S. CESPITOSA L., *Sp. Plant.* ed 1 (needlessly changed to *cæspitosa* in the second edition; both forms are classical), *in part* (excluding the synonyms), and of Herb. Linn.!; not of Koch, &c.—Very rare in

Great Britain, and only occurs here in small quantity ; absent from Ireland. 97. Ben Nevis! (*Woods*), and the neighbouring Glen Spean mountains! 94. Ben Avon! 92. Ben-na-Bourd! 49. Above Cwm Idwal!; also reported from Snowdon. Recorded by Hudson from Westmorland (v. c. 69), on the mountains above Ambleside (Helvellyn is the most likely spot). There is a cultivated specimen from Kew Gardens, probably obtained through him, dated 1781, in Herb. Smith, and annotated—in Smith's handwriting—"*muscoides* D. Don"; another, apparently wild, in the Edinburgh Herbarium, labelled "Westmorland"; and a third, from Dickson's Herbarium, in Babington's set at Cambridge, collected by his uncle, Thomas Gisborne (no date), from the same county. These last two are scrappy, and barely determinable; but I passed them as being apparently correct. The Kew Gardens example is untypical, and will be mentioned again below. In Scotland it ranges from over 4400 feet down to 3400 feet and probably less; the English and Welsh localities are lower. Northern and Arctic:—Scandinavia, Faeroes, Iceland, Spitzbergen, Greenland, and the Rocky Mountains.

S. INCURVIFOLIA D. Don, *l. c.*, p. 423. *S. grœnlandica* Engler, in part. *S. hypnoides*, subsp. *hirta*, γ. *incurvifolia* Syme. *S. cæspitosa*, var. *incurvifolia* Bab.—This is endemic in Ireland; the special Saxifrages of that country belonging to this section have strangely little in common with those of the Pyrenees. I have only seen one authentic specimen, which was sent by D. Don in 1826 to William Peete, whose collection is now in the possession of Mr. S. H. Bickham (see Journ. Bot. 1916, 139): it was gathered late (in fruit) and agrees well with both my wild and cultivated plants. The figure (*E. B. S.* 2909) looks much coarser and more hairy, and seems to be a young state of the rather variable *S. hirta* Sm.; which accounts for Syme's being misled, as these two species are totally unlike. Nor is *S. incurvifolia* a variety of *S. cespitosa*, as Babington supposed; for it stands the hardest winters of Surrey and Somerset quite well, whereas *S. cespitosa* will not live out of doors, with me, and has to be raised afresh every year from seed, under glass, at Edinburgh. They are also very different in habit, colour, foliage, inflorescence, and clothing. The Kew Rockery plant, as Mr. Williams informs me, just matches my own; most likely it came from the garden at Trinity College, Dublin, where Mackay's roots from Kerry are, or used to be, grown.

Very rare. Kerry: Brandon Mountain!, chiefly at or near the summit, but in 1902 I found a fine tuft at 1200 feet or less; Beeowen Mountain, north of Sneem, *R. W. Scully*; Macgillicuddy's Reeks, *H. C. Hart*! Galway: Muckanaght, Twelve Bens, *H. C. Hart*! It is likely to occur on the Galtees, Co. Tipperary. The leaves are usually *not* incurved.

S. GRŒNLANDICA L. There is no specimen in Herb. Linn.; and this may partly account for the prevailing confusion regarding it. Linnæus himself can hardly have seen a *living* plant, if any; and his citation from Dillenius changes "*cauliculis* valde foliosis" into "*caulibus*." Again, his short diagnosis:—"Saxifraga foliis caulinis palmato-multifidis sparsis: laciniis acutis, caule erecto," besides being very vague, does not tally as to the stem-leaves with the carefully drawn figure (of which a tracing, kindly furnished by Dr. Rendle from the copy in the National Herbarium, lies before me), nor with the full account in *Hortus Elthamensis*, pp. 337–8. I strongly suspect that he wrote from memory, or from imperfect notes, and had not the passage on which his species depends at hand for reference. D. Don and Smith agree in reckoning *S. grœnlandica* as a mere synonym of *S. cespitosa* (the true Lapland plant). I can see nothing in the figure, t. ccliii. f. 329, nor in what Dillenius wrote, to separate the two, except that his drawing is decidedly more leafy and stronger in the whole of the lower parts; a difference which might easily be due to an arctic climate. His roots from Greenland were planted, and (as he says) "aliquousque gliverunt, sed postea perierunt, ob aërem nostrum temperatiorem gelidarum regionum plantis minus faventem"—just as usually happens with our Scottish *S. cespitosa*, when cultivated. He adds that specimens of the same thing are preserved "in Phytophylaceo Sherardino," sent on two occasions by different authors; which accounts for the Linnean distribution: "*Habitat* in Groenlandia, forte etiam in Pyrenaeis et Helveticis alpibus." That these European plants were really conspecific is *primâ facie* unlikely; by favour of Mr. G. C. Druce I have examined one of them, which is a mere scrap, and hardly determinable, but certainly not *S. cespitosa, vera*. I have only seen two British examples which *may* be *S. grœnlandica*. The first was gathered by Mr. Druce on Ben Lawers, and has been so named by Engler. The material is scanty, and rather far advanced; it reminded me of very dwarf *S. Sternbergii*, the leaves—at this stage—being glabrous; but I was not aware, when I saw them, how important this and the Sherardian examples might be. The other is the cultivated plant from Kew, in Herb. Smith, already mentioned.

But this case is still further complicated by the fact (as Mr. Williams has informed me) that in Syst. Nat. ed. 12, p. 309, Linnæus quoted *Flora Danica*, t. lxxi, as representing his *S. grœnlandica*. That figure, as was stated by Mœnch, when publishing *S. rosacea*, well depicts *S. decipiens* Ehrh., *Exsiccata*, No. 5! Consequently, much of the "*grœnlandica*" in our public collections from circumpolar countries is this; and some good botanists claim that *S. grœnlandica*, being an older name, ought to displace *S. rosacea* (*decipiens*). My answer is threefold :—1. Linnæus did not *know* his own species. 2. A *nomen incertum* is invalid. 3. The Dillenian plate cannot be *S. rosacea*; and the description of the upper root-leaves: "læte virentibus, crassiusculis" is quite different from the greyish villous foliage of that species, while agreeing well enough with *S. cespitosa*.

Haworth, whose judgement was much less sane, on the whole, than either D. Don's or Smith's, and whose inadequate definitions often make his species and varieties almost impossible to identify, added to the muddle by referring the *S. tridactylites grœnlandica* of Dillenius to "*S. muscoides* Jacq." [Wulfen in Jacq. Misc. ii. p. 125], which is a plant of the Alps, Pyrenees, &c., and not arctic; also by placing *S. grœnlandica* L., as a different species, among his

§ *Quinquefidæ.* I have been obliged to elaborate these points at great, though I hope not at undue length, in order to give all the evidence at my disposal.

S. STERNBERGII Willd. Enum. p. 462 (1809); Sternberg, Rev. Sax. p. 56, tab. xxiv. *S. decipiens*, ζ. *Sternbergii* Haworth, Sax. Enum. pp. 31–2; but he adds: "non vidi," an admission which renders his opinion worthless. *S. palmata* Panzer, in Sturm, Deutsch. Fl., 26 Heft t. 10, f. 2, *non* Smith. *S. decipiens*, ε. *Gmelini*, α. *major*, Sternberg, Rev. Sax. Suppl., Decas ii. p. 76. Here, however, *S. sponhemica* and *S. condensata* of C. C. Gmelin are likewise given as synonyms, which is plainly a blunder. From other signs in this book, I suspect that the author's brain was no longer so clear as when he wrote his excellent *Revisio.*

My wild specimens (No. 3649) from Brandon Mountain exactly match one in Smith's herbarium, gathered in 1822 near Nuremberg by Dr. Panzer, who first found this species; and more luxuriant, garden-grown material agrees perfectly with Sternberg's figure xxiv, also taken from a cultivated plant. *S. Sternbergii* is most nearly allied to *S. rosacea*, and might be taken, superficially, for a variety or subspecies of it. Having grown them side by side for nearly six years, I am satisfied that this is not the case. *S. Sternbergii* is much more densely tufted, bright green at all seasons, with rather fleshy foliage, which is glabrous, but for some ciliation. The stem-leaves are simple, or only the lowest 3-cleft, never palmate. The petals are pure white; in *S. rosacea* they are sometimes creamy white. Small plants, from high exposed rocks, mimic *S. cespitosa* in habit. There is considerable variation in the breadth of the leaves; and forms with narrow, acute foliage and pointed sepals, which have been found in Co. Clare, on Brandon Head, &c., may need a special name.

Its occurrence in Ireland offers a geographical puzzle; for it is only recorded on the Continent from Bavaria, the Harz Mountains, and one place in Norway. Perhaps these widely-separated stations may be the relics of a boreal type, formerly scattered over the whole of western Europe.

The Irish distribution is a little uncertain, owing to its having been strangely confused with *S. hirta* Sm., a hairy and very different species. Kerry:—Upper parts of the Brandon range, where it ascends to 3020 feet. Clare:—Black Head and Ballyvaughan; "Burren and Inishmore abundant," Irish Top. Bot., p. 125. Galway:—Aranmore, *R. Ll. Praeger*, in Herb. Dublin! The Donegal plant I have not seen. It descends to near sea-level in Clare and Galway.

S. ROSACEA Mœnch, *Methodus Marburgensis*, p. 106 (1794). *S. decipiens* Ehrhart, Beiträge, v. 47 (1790—*nomen nudum*), and *Exsiccata*, No. 5! *S. petræa* Roth, *Tentamen*, i. 184 (1888), *non* L. *S. cæspitosa* Smith, *E. B.*, Koch, &c., *non* L. *S. palmata* Smith! *S. villosa* Sternb. It is a pity that the familiar name *S. decipiens* cannot be retained.

A well-marked species, which Engler placed as *forma vulgaris* of a "typus polymorphus"; no doubt owing to his Monograph being compiled before he had an accurate knowledge of all the plants included, for such an arrangement cannot stand. Like *S. Sternbergii*, it varies somewhat; but *S. hirta* Sm. is the only one of our plants which can reasonably be confused with it, when dry, and they are easily separable, when growing. It flowers, on an average, three weeks earlier than *S. hirta* and *S. Sternbergii*, in cultivation.

Very rare and local in our Islands. Wales:—v. c. 49 Carnarvon, in and above Cwm Idwal; on Snowdon, and in the adjacent Cwm Glas. Scotland:—reported from Ben Lawers, but the only alleged specimen which I have seen was wrongly named. Ireland:—Kerry, very rare on Brandon Mountain, at about 2800 feet! Cairn Tuhol!, Aug. 17, 1852, Herb. Edinburgh; collector's name not given, but I think that the handwriting is I. Carroll's. Without inflorescence; the habit and leaves are, however, quite characteristic. Also recorded from Slieve Mish—named by Engler, and likely enough to occur there; but Mr. Scully's gathering, as represented in Herb. Druce, is a mixture of *S. hirta* Sm. and (I think) *S. incurrifolia*. Galway:—On one of the Twelve Bens, 1882, *H. C. Hart*! This is a stunted state, like that figured in *English Botany*, ed. i., as *S. cespitosa*; it was so named by Mr. Baker. Mayo:—Croaghmore Cliffs, Clare Island, 1903, *R. Ll. Praeger*! Abundant here, from 1200 down to 150 feet. This has larger petals than the Welsh plant, of a purer white, not so distinctly 3-veined, and less decidedly orbicular, on first expanding. *S. rosacea* is a native of Germany; Bohemia and Moravia; the Faeroes; Iceland; and the Arctic regions.

Obs.—In Mr. F. J. Hanbury's herbarium there is a plant which he gathered at Twll Du, v. c. 49 Carnarvon, April, 1882; the Rev. A. Ley referred this to *S. decipiens*. It has broad petals and sepals, very much like that; but the leaves are glabrescent, narrower, acute, and often bristle-pointed. I strongly suspect that it may be a hybrid, perhaps *S. platypetala* × *rosacea*.

S. HIRTA Haworth, Misc. Nat. 164 (1803): Enum. Saxifr. 32 (1821).—Of this I have seen no authentic material. In the former work he placed it between *S. quinquefida* and *S. palmata* Sm. (*rosacea*); in the latter between *S. decipiens* and *S. platypetala*, with the remark:—"Species bona, petalis orbiculato-ovatis albis triplilinea virescente. An affinior *S. quinquefidæ*? Habitat in Europa, non in Britannia" [in Misc. Nat.:—Habitat in alpibus Scotiæ"]. Under *S. hibernica*, β. *Smithii* (Enum. Saxif. 29) he says:—"*Sax. hirta*, Engl. bot. t. 2991.—*Nec nobis in Misc. nat.*; quæ nondum spontanea in Britannia." He received it from Donn (*not* Don), and it is the plant of Hort. Cantab. ed. v. 507: but this is a mere catalogue name, later (1805), and inadmissible. Judging by description and sequence, it cannot be Gmelin's *S. sponhemica*. I think that this name may safely be ignored; and Mr. Williams concurred.

S. HIRTA Smith, Engl. Bot. t. 2291!, and Herb. Smith!; also of D. Don, *l. c.* (*non* Haworth). *S. hibernica* Haworth.—Smith and D. Don were quite right in separating this specifically from *S. decipiens*, as I have proved by growing them both; it would waste space to give details now. Whether or no it occurs on the Continent I am unaware. D. Don says that his father's Scottish specimens from the

Western Highlands of Scotland exactly agree with Mackay's (who first found it on Brandon, in 1805); these I have not seen, but there is some resemblance between the vegetation of those parts and that of western and northern Ireland, owing to the mild climate.

Kerry :—Abundant on the Brandon range! and the Reeks; near Sneem and Waterville; Glencar; Slieve Mish range; also reported from Killarney, but Mr. Scully is sceptical. Ranges from 1500 to 3150 feet. Clare :—Great Isle of Arran [Aran], 1850, *Melville* in Herb. Syme! Tipperary :—Galtees!; very probably the "*sponhemica*" of the Comeraghs (Co. Waterford) may be identical. Donegal? :—Aranmore, 1881, *H. C. Hart* (*Fl. Donegal*).

An allied, but distinct species, first observed by Mr. Druce in 1906, of which I have seen cultivated material (1907) from his herbarium, and which was gathered on the summit of Brandon Mountain, I found rather frequently on the upper part of that range, in 1911, and have had it under constant observation in my garden, ever since. Although reluctant to increase the number of names, I hope to describe this, later on. It has been drawn by Mr. E. W. Hunnybun.

S. SPONHEMICA C. C. Gmelin, *Flora Badensis Alsatica*, pp. 224–6. *S. quinquefida* Baker, *l. c.*, *in part*; Engler, *l. c.*, p. 188; *non* Haworth!—Unknown to D. Don, Haworth, and Smith; but the first-named had Gmelin's *S. condensata*, which is only a form of this, in cultivation. The very minute original description of *S. sponhemica* gives a good notion of the characters; but it is over twenty years since I examined material from the *locus classicus* at S. Kensington, and in such a case one cannot safely trust to memory. However, Haworth definitely records *S. condensata* as having been found by his father "in montibus Scotiæ"; and I think that the true plant does occur rather freely in some parts of Great Britain and Ireland.

S. QUINQUEFIDA Haworth, Misc. Nat. 163; Enum. Saxifr. 30. *S. sponhemica* Baker, *non* Gmelin.—This was unknown to D. Don and Smith. though the former may refer to it, among the synonyms of *S. pedatifida* (p. 414): "S. quinquefida, *var. Lam. Fl. Fr.* iii. *p.* 533?"; and the latter, in Engl. Fl. 280, quotes "S. quinquefida *Donn Cant. ed.* 5. 107." Haworth at first placed it next to *S. geranioides*, remarking that it was affine to that, but far smaller; afterwards he put it in ** *Pedatifidæ*, but inserted his *S. viscosa* between them. It was thus placed by its author in quite a different group from *S. platypetala*; he included this in *** *Quinquefidæ*, to which our other Hypnoid segregates belong.

In the *Supplement* to *English Botany*, ed. 3, pp. 183–5 (1899), Mr. N. E. Brown ably and impartially reviewed the status of this plant, giving a full English description, based on G. Don's specimens. His conclusion—certainly right, I believe—is that it is not *S. sponhemica*; and he thinks that it comes nearest to *S. geranioides* var. *ladanifera* Gren. & Godr., though not identical.

Last autumn I was able to have a few hours' work at the Kew Herbarium, mainly in order to examine the material in this case. *S. quinquefida* is only known from cultivated examples, alleged to have been found by the elder Don before 1801 (it is noteworthy that his son did not keep it up as a species); he wrote on the label of his specimen:—"I discovered this on mountains in Perthshire upwards of 20 years ago. . . . . It may be an intermediate plant, but not a hybrid one." No man has a higher respect than myself for the splendid pioneer-work done by George Don, several of whose additions to our Flora I have gathered in their original stations. It is no disparagement to suggest that in this instance, as in others which are better known, he believed a root received from abroad to have been collected by himself, owing to a confusion of labels, or some other accident, such as most gardeners have suffered from.

I am well acquainted with the flora of the Perthshire hills as a whole, and have studied the British Saxifrages of our principal collections without coming across anything at all like *S. quinquefida*; and my considered judgement is that it cannot be ranked as a native of Britain.

S. LEPTOPHYLLA D. Don, *l. c.*, pp. 450-1; an Persoon, *Synopsis*, i. 490 (1805)??—This is well and fully defined by Don, who states that it grows "in alpibus Helveticis et in Cambro-Britanniæ montibus"; his *β. angustifida*, only found in Wales, seems to be merely a more slender state, with narrower leaves, and not worth keeping up as a variety.

In 1912 I met with a Saxifrage which was quite new to me, and very different from our others of the *sponhemica*-set, growing plentifully in Cwm Idwal; on the peak of Snowdon; and in Cwm Glas: it is doubtless common on the Carnarvonshire hills, as bad weather and mists curtailed our excursions. It was associated with *S. hypnoides*, putative hybrids being frequent. Mr. C. E. Salmon lately sent me for examination a sheet gathered by him near Beddgelert, with pinkish buds, and the rosettes at the base of the stems rather densely clad with soft white hairs, but otherwise quite like my series. In Herb. Borrer at Kew there is a scrappy specimen labelled "Sax. leptophylla. Breiddin Mountain, 1834" (Craig Breiddin, Montgomeryshire); it is too imperfect to be named definitely, but looks right.

Working through Don's Monograph, I came to the conclusion that this series represented his *leptophylla*. Mr. Williams wrote that my specimens in Herb. Brit. Mus. were referable to it; he did not, however, believe them to be Persoon's Swiss plant, but a species endemic in Wales, which he intended to describe and rename.

Persoon's diagnosis is very brief:—"59. *leptophylla*, procumbens, glabra, fol. longe petiolatis trifidis quinquefidisque: laciniis linearib. divaricatis. S. procumbens et hypnoides. Herb. Juss. cfr. Willd. Sp. ii. p. 658. no. 49. Hab. in alpibus." Our Welsh plant differs in never being quite glabrous; nor are the leaf-segments divaricate. There are no axillary buds like those of *S. hypnoides*; the habit and flowers are also unlike that. Sternberg (Revisio Saxifr. 59) remarks of *S. leptophylla*, *sponhemica*, and *condensata*:—"Hæ tres plantæ adeo inter se conveniunt, et a *Saxifraga hypnoide* absentiâ bulborum tantum potissimum differunt, ut non nisi cultura et continua observatio earum differentiam vel identitatem comprobare possit. Una earum, quam ante plures annos nomine *S. hypnoidis* accepi et colui, stolones longe lateque super petras spargit, et cum descriptione *S. condensatæ* maxime convenit; inflorescentia autem apice ramosa variat, estque aliquando pauciflora, sæpius quinque et octoflora." There seems, then, to be cause for doubt as to the validity of *S. leptophylla* Pers.

S. AFFINIS D. Don, *l. c.*, pp. 418–9; Engl. Bot. Suppl. t. 2903. *S. hirta β, affinis* Syme, E. B. ed. 3, pp. 81–2. *S. sponhemica* Baker (*pro minima parte*), *non* Gmelin.—A very distinct species, I believe; not at all closely allied to *S. hirta* Sm., nor yet, so far as can be judged from dried *S. ajugifolia*, to that Pyrenean plant. There are authentic specimens, originally from the summit of Brandon Mountain (Mackay first found it there in 1805), in Herb. Smith and Herb. Edinburgh; it is also grown on the Kew Rockery.

The character of the inflexed petals, on which both Don and Smith strongly insisted, is certainly not constant. It does not appear in the dried authentic plants, nor in the cultivated one at Kew, of which I have seen freshly gathered pieces. The *English Botany* figure well represents its habit, though the leaf-segments are drawn too broad and blunt (they really taper into a long, slender, hyaline point); it is also "faked" to order! The original sketch has the petals flat; the detached one on the plate was added later.

This has not been observed for many years in the original station; but it surely exists on other parts of the extensive Brandon range, and probably elsewhere. Mr. Baker named a plant collected on Caherconree, Slieve Mish range, by H. C. Hart, as *S. affinis* Don (Fl. Kerry); I have not seen this.

S. PLATYPETALA Smith, in Trans. Linn. Soc. x. 391; Engl. Bot. t. 2276. *S. eu-hypnoides α, platypetala* Syme, E. B., ed. 3, p. 83. *S. sponhemica* Baker (*pro majori parte*!), *vix* Gmelin.—The *English Botany* figure—apparently drawn from garden-grown material—has much larger flowers than the type-specimen in Herb. Smith!; and the leaf-ciliation is much exaggerated in 3rd edition reprint.

S. platypetala is common in the central and south-western hill-districts of Scotland, where it ascends to between 3000 and 4000 feet, though often subalpine, or even lowland, and on the Welsh mountains; probably, also, in England, from Derbyshire northwards, and in the northern half of Ireland; but I have not seen it from Kerry, the Galtees, &c., all the plants so labelled being states of *S. hirta* Sm. It is certainly distinct from true *S. hypnoides*; they often grow together, and (I feel sure) cross freely, which may account for their having been combined by some museum-botanists.

S. ELONGELLA Smith, in Trans. Linn. Soc. x. 340; Engl. Bot. t. 2277. *S. sponhemica* Baker (in part).—I have not seen this in a living state, and have not yet come to a definite conclusion about its rank; but it clearly approaches *S. platypetala*, and may be a modification of that. The absence of axillary buds in all G. Don's original specimens from Lintrathen (north of Airlie Castle, Glen Isla, Forfarshire) is against its inclusion under *S. hypnoides, vera*. In Herb. Dublin there are two small examples from him (Loch Callater, S. Aberdeen, and "mountains of Aberdeenshire and Angus-shire"), which appear to be the true plant. E. B. 2277 was probably figured from the *dried* type-specimen in Herb. Smith, having just the same abnormal habit; the original drawing shows much more copiously ciliate leaves, less coarse than in the coloured engraving.

S. LÆTEVIRENS D. Don, *l. c.*, pp. 451–2.—This has never been figured; and the only authentic example known to me, probably from hills to the north of Loch Lomond, where Don says that he observed it, is in Herb. Kew. It was first found by his father on the highest mountains of Angusshire and Aberdeenshire. The original Latin description (Don calls it "this very distinct and elegant species") and Smith's English one (Engl. Fl. 280) suggest that it comes very near *S. platypetala*; Smith had not seen it. I think that a sheet which I collected on Ben More, v. c. 88 Mid Perth, above 3000 feet, on June 30, 1888, and noted as having "herbage greener, and flowers yellower, than in our ordinary sponhemica," agrees very well. There is much difference in habit and foliage from *S. platypetala*; and Mr. Baker thought it "a state [of his *sponhemica*] approaching *cæspitosa*." The leaves of the central rosette and of the barren shoots are more numerous and more crowded than in *platypetala*, and usually have broader segments; the herbage and stems are also decidedly more glabrous. Flowers fewer (one to four); lateral pedicels strongly recurved in bud. Petals closer-set, flatter, with three conspicuous greenish veins. Sepals mostly recurved at the mucronate tips after flowering. I believe, also, that some gatherings from Correifron and Midlaw Burn, near Moffat, v. c. 72 Dumfries, by Rev. W. R. Linton and myself (in the former station by him, 1890, as *S. sponhemica*), and which I distributed as *S. hypnoïdes* in 1907, cannot be either that or *S. platypetala*, and belong to *S. lætevirens*; but none of the above-mentioned plants have yet been compared with the Kew material, so the matter is still an open question.

S. HYPNOIDES L., Sp. Pl. (1753), and Herb. Linn.! *S. eu-hypnoides β. gemmifera* Syme, E. B., ed. 3, p. 83, t. 562. The original *English Botany* figure, t. 454, is very poor.—Our normal form is just like the Linnean type. It varies a good deal, according to situation; but the alleged varieties have no permanence. *S. densa* Haworth, Misc. Nat., of which there is a cultivated specimen in Herb. Kew. is a case in point.

There is, however, a very fine, strong form from Black Head, Co. Clare (*H. C. Levinge*, sp. 1892), doubtless also to be found elsewhere on limestone in the West of Ireland, which is so different from all our others that it deserves description as a new variety. I have the same thing in my garden, sent by Mr. Praeger for Mr. Hunnybun to draw, and passed on to me. Grown close to the type (from Cheddar), it keeps quite different; notably in the absence of axillary buds on the long barren shoots, and in its very large, orbicular or obovate, more distinctly 3-veined petals.

I have not noted the altitude reached, but believe that I have seen *S. hypnoides* (*vera*) up to fully 3500 feet on Ben Lawers; it also grows low down. Scotland, from Sutherland to the Border. England, in the north and west (including Wales), reaching its southern limits in N. Somerset and Cornwall (Dingloss, June 1868, *R. V. Tellam* in Herb. Brit. Mus.!). Ireland, mainly western.

Formerly I suggested that some of our rarer "mossy" Saxifrages might be of hybrid origin; a longer experience, however, makes this seem unlikely. Crossing appears to be common in most gardens; but as yet my own British species have kept quite unmixed, perhaps for lack of the needful insect-visitors.

Although it does not, strictly speaking, come within the lines of this paper, I may say here that *S. stellaris* L., var. *fontana* Druce (provisionally) in *Annals of Scottish Natural History*, 1892, p. 131, agrees rather well with Engler's description (Mon., p. 132) of forma *glabrata* Sternb., Suppl. ii. 13:—"Tota glaberrima; sæpius folia minora remotiuscula, apice tantum dentata vel integra. Pedicelli tenuissimi," Engler says that it grows in very moist, springy places, and quotes *Fl. Danica*, t. 23, as depicting it. This figure seems to me to be only the normal plant, with the hairs left out. The specimens in Herb. Druce come from Aonach Mor (96); Glen Callater (92); Meall Gorm (105); Ben Wyvis (106), *Lady Davy*. I think that I have seen it on the Cairngorms and elsewhere. Whether or not it is constant should be proved by culture under more normal conditions.

SHORT NOTES.

Double-Flowered Epacrises. Dr. Hemsley contributes the following note to *The Garden* for March 3:—"I see with pleasure that a double-flowered Epacris is still recommended as a desirable winter-flowering subject. My first knowledge of a double-flowered Epacris dates back to the early sixties of the last century, when the late Baron Ferdinand von Mueller sent to Kew a specimen labelled "*Epacris impressa* var. *pleniflora*. Stawell, T. Holt." Knowing that Dr. B. Seemann, then editor of the *Journal of Botany*, was specially interested in double flowers of wild origin, I showed him the specimen, and he recorded it in the *Journal of Botany* (1865, p. 157) with the remark that it was the first instance of a genuine Australian plant with double flowers. Mueller's specimen is small, but it is densely beset with showy, very double, white flowers. Stawell, I may mention, is in the State of Victoria. Dr. M. T. Masters examined the specimen in question and gave the result in the same volume (p. 354). It exhibits the hose-in-hose form of doubling, the corollas being repeated one within the other, the lobes of each alternating with those of the one immediately preceding it. Mueller himself records two double-flowered varieties of *Epacris*, namely, *E. impressa* var. *pleniflora*, from Nunawading and Port Phillip, where it was rare; *E. purpurascens* var. *pleniflora*, on rocks at Parramatta, near Sydney, New South Wales. The Rev. W Woolls, writing in 1885 on the double flowers of Australia, states that no family of the Australian flora has such a tendency to produce double flowers as the *Epacridaceæ*. *E. purpurascens* was one of the first discovered in that condition, having been found many years previously on Elizabeth Farm, near Parramatta, and subsequently at the North Rocks in the same district. A double-flowered variety of *E. microphylla* was found at the North Shore and Manly Beach. The same botanist also records the discovery of wild double-flowered varieties of *Sprengelia incarnata* and *Astroloma humifusum*, members of the same family."

Abnormal Flower of Ranunculus Ficaria. At the April meeting of the Liverpool Botanical Society, I exhibited in the fresh state a curious flower of the Lesser Celandine, sent by Mr. Albert Wilson from near Bentham in Yorkshire. The flower was almost completely double, and of a vivid green colour. I presume that Mr. Worsdell would call it an example of pleiotaxy of the corolla, with phyllody of the petals. Pleiotaxy in varying degree is frequent in this species, but I have not previously met with an example of phyllody, which seems to be much more unusual.—J. A. Wheldon.

Variation in Asarabacca. I have had *Asarum europæum* L. in cultivation for many years, from the original habitat in Deerfold Forest, Herefordshire, where it has long been naturalised. It seeds itself freely, and this year I have detected a vigorous plant which shows a marked variation from type; it may be worth putting on record and I should be glad to learn whether it has been noticed before. The conspicuous feature of the common Asarabacca is the highly polished, glistening surface of the coriaceous leaf; in the new form the leaf-surface is quite dull and of a thinner texture. There is also a slight difference in the colour and shape of the flower. The characters may be contrasted thus:—

A. europæum: leaves reniform with highly polished cuticle and small sparse hairs on upper surface; flower greenish outside, dark chocolate within, perianth narrowing, tips curved inwards.

Form: leaves similar in shape, but thinner in texture, surface dull, with more numerous hairs. Flowers dull green outside, brown within, wider, more campanulate, perianth tips incurved.

The only other species I have in cultivation is *A. caudatum* Lindb. (syn. *Hookeri*), belonging to the same section of the genus, *Euasarum*. The seeds were sent me a few years ago from British Columbia. It is a good deal larger, with cordate pointed leaves of corrugated texture and dull surface; the flower is much larger, dull brown, campanulate with long-tailed perianth tips (1 inch). The form does not show any marked resemblance to this plant such as might suggest a hybrid origin. Dr. Rendle and Mr. Baker, who have kindly examined the plant, consider it to be an interesting variation of *A. europæum*.—Eleonora Armitage.

Fruiting of the English Elm. This note is to call attention to the abundant production of samaras in our great English Elm (*Ulmus campestris*). After a recent heavy thunder rain the ground was strewn with myriads of immature fruits. This southern species, native of Spain and parts of France besides the south and west of England, usually flowers here in January (dates recorded Jan. 16–24) and February (Feb. 6, 12, 13, 27, the last the latest record); but in this abnormal season it did not flower till April 4. The Wych Elm is a little later, dates recorded from Jan. 25 to March 10, mostly in February; this year April 3. The flowers of the English Elm thus for a wonder escaped severe frost and hence no doubt the fruit production, which I only recollect on three previous occasions.—ELEONORA ARMITAGE.

REVIEW.

Plants, Seeds and Currents in the West Indies and Azores. By H. B. GUPPY, M.B., F.R.S.E. 8vo. Pp. xi, 531. With 3 maps & frontispiece. London: Williams & Norgate, 1917. Price 25*s*. net.

MR. GUPPY has devoted many years to the study of seed dispersal across the great oceans and its bearing on problems of plant distribution. He has approached the subject with a thoroughness and observation of detail such as renders his published work a storehouse of facts of inestimable value for the student of geographical distribution. Nearly forty years ago he studied during three years the Geology and Natural History of the Solomon Islands, later he investigated the Cocos-Keeling Islands and formulated views on plant dispersal based on his study of their flora, while his book on *Plant Dispersal* (1906) embodied the results of three years' work in the Pacific Islands. The present volume embodies the results of investigations carried out in the West Indies and Azores between 1906 and 1914.

It is gratifying to note that the Linnean Society has recognized the great value of Mr. Guppy's work by awarding him the Gold Medal at the recent Anniversary Meeting.

The closely printed pages of the volume before us are full of interesting matter; facts of the author's observation and deductions therefrom are correlated and compared with the results of the observation and the deductions of other workers. Each chapter is of the nature of a scientific memoir and its concluding summary supplies a useful précis of the contents.

The first chapter deals with the West Indian beach-drift, its sources of supply and its distribution, which were investigated during four winters. The Turks Islands were selected for special study; the beach-drift of these islands is considered as representing oceanic drift in transit, and the fact emerges that one-third of the fruits and seeds that figure in the foreign drift of the beaches of the Turks Islands has been found stranded on the coasts of Europe. An account of the West Indian drift on European shores follows, including reference to the literature from Clusius onwards, and the various records are described under the headings of localities. But the floating seed can tell us nothing of its route, and although we should usually be right in assuming that a tropical seed cast up on a European beach came from the West Indies it may have started from the Amazon or even from the mouth of the Niger. The evidence of bottle-drift is more trustworthy, and to this subject the following chapter is devoted. The result of a balance of account respecting the interchange of seed-drift between the Old and the New World, shows that the gifts from the New to the Old World would be unimportant and not to be compared with the large amount of effective seed-drift that must be rushed in a few months across the tropical Atlantic in the streams of the North and Main equatorial currents. This important conclusion is made the basis of a comparison between the West Indian and West African Floras.

Several chapters, comprising nearly 150 pages, are devoted to a detailed discussion of the individual plants, comprising first the larger foreign drift of the Turks Islands and secondly the West Indian littoral flora in general. The distribution of each plant and its capacity for dispersal are fully considered. The two following chapters deal with the general characters and geological structure and flora of the Turks Islands. The plants may be grouped as those of the shore and those of the inland scrub. The former are not only found over the West Indian region but often also in the Old World. The latter are all plants of the New World.

Short chapters are devoted to the Differentiation theory and its relation to Distribution, and the three closing chapters are a detailed account of the author's observations on the flora of the Azores. His principal study was the altitudinal ranges of the indigenous plants, their distribution and mode of dispersal, in which last birds have played the principal part.

An appendix gives in the form of notes, to which reference is made in the body of the work, fuller details on specific points, and there is finally a very full General Index.

A. B. R.

BOOK-NOTES, NEWS, ETC.

At the meeting of the Linnean Society on April 19th Dr. D. H. Scott read a paper on "The Heterangiums of the British Coal-Measures," illustrated by lantern-slides, of which the following is an abstract:—*Heterangium* Corda is a genus of Carboniferous plants, based on specimens with the structure preserved, and now classed with the Pteridosperms. The stem is protostelic, with parenchyma among the tracheides; the peripheral xylem-strands and leaf-traces are mesarch; the metaxylem and secondary tracheides have multiseriate bordered pits. There are plates of sclereides in the cortex, and the hypoderma consists of alternating radial bands of fibres and parenchyma. In the only fully investigated species, *H. Grievii*, a single leaf-trace bundle passes out into each leaf. In this species the leaves were large and compound, of the *Sphenopteris* type. Williamson in his published papers only recognized two British species, *H. Grievii* and *H. tiliæoides*. Under the former name he included not only the Lower Carboniferous plant from Burntisland, on which the species was founded, but also certain Coal-Measure forms from Dulesgate. In the joint work by Williamson and the author the same nomenclature was adopted, but a second form from Dulesgate was also described under the provisional name *H. cylindricum*. *H. tiliæoides*, a Coal-Measure species from Halifax, remarkable for the great development and perfect preservation of the phloem, has been kept distinct ever since its first discovery in 1886. The enormous difference of age between the Burntisland and the Dulesgate plants rendered their specific identity highly improbable. and the latter have been separated under the name *H. Lomaxii*, after the name of the discoverer, originally suggested by Williamson himself though not published by him. A fine *Heterangium* from Shore was discovered by Mr. Lomax and his son in 1912. It is a large stem, 18 mm. in diameter, though almost without secondary growth. Two leaf-trace strands leave the stele for each leaf dividing into four in the cortex and into eight in the petiole. This is the best example known of a polydesmic *Heterangium*; the species appears to be distinct and may be named *H. shorense.* It has been found, however, that other Coal-Measure species were also polydesmic. In *H. tiliæoides* there are four separate bundles in the petiole and the same is the case in *H. Lomaxii*. In all these plants two bundles start from the stele, dividing into four on or before entering the leaf-base. The three species are also characterised by the sharp differentiation of the peripheral xylem-strands and by an approach to exarch structure. It is proposed to group *H. shorense*, *H. tiliæoides*, and *H. Lomaxii* (of which *H. cylindricum* is only a form) in a new subgenus, *Polyangium.* It is probable that the Upper Coal-Measure species from Autun described by Renault also fall under this subgenus, while most of the very interesting Silesian species, of Millstone Grit age, recently discovered by Dr. Kubart, appear to belong to the simpler type which may be called *Eu-heterangium.* Among the British Coal-Measure species it is only in *H. minimum*, sp. n., that a single bundle leaves the stele, dividing into two in the cortex. The polydesmic species of *Heterangium* show an interesting analogy with the simpler Medulloseæ and with the protostelic Calamopityeæ, and may also be compared with Dr. Gordon's new genus *Rhetinangium.*

AT the meeting of the same Society on May 3rd Mr. H. W. Pugsley gave a summary of his recently completed paper, "An Enumeration of the species of *Fumaria*, section *Sphærocapnos.*" After quoting Shakespeare's allusion to "rank fumiter" in "King Lear," he mentioned the earliest known references to these plants, under the name of καπνὸς, smoke, which date back to Dioscorides and the elder Pliny in the first century; and drew attention to the ancient plate in the Vienna Codex of Dioscorides, which was apparently drawn from *F. officinalis.* The modern generic name first appears in Bock (Tragus), Fuchs and Matthioli. Allusion was then made to the curious but universal connection between Fumitories and smoke, and the various explanations that have been suggested for it. The treatment of these plants by Gerard, Ray and other pre-Linnean authors was touched upon, and it was shown that six annual species were distinguished before the time of Linnæus. In the *Species Plantarum* of 1753, two species only of true *Fumariæ* are included, the remainder of the Linnean genus consisting of plants since transferred to *Corydalis* and elsewhere. The works on the genus by Handschuch (1832) and Parlatore (1844) were then referred to, after which the classification of the much more complete Monograph by Olof Hammar (1857) was explained with the help of diagrams, and it was demonstrated that two of Hammar's three generic sections, the *Agrariæ* and the *Capreolatæ*, were morphologically closely connected, while his third section, the *Officinales*, was more distinct. It was then contended that the section *Sphærocapnos* most naturally divides into two primary groups, viz.:—*Grandifloræ* (the *Agrariæ* and *Capreolatæ* of Hammar) and *Parvifloræ* (Hammar's *Officinales*), an arrangement practically coinciding with Haussknecht's division into *Latisectæ* and *Angustisectæ* in his treatise on these plants in "Flora" (1873). Additional weight was lent to this view by references to geographical distribution, which shows that while the *Grandifloræ* are plants of the Mediterranean region and Western Europe, the *Parvifloræ* have a much wider range and are more prevalent in Eastern Europe and in Asia. Attention was directed to the tendency to cleistogamy in the genus—most marked in the large-flowered species—and illustrative figures of *F. sepium* in different conditions were shown. The intrinsic beauty of many of the *Grandifloræ*, rendering them desirable objects for garden cultivation under suitable environment, was also briefly mentioned. Lack of time prevented detailed reference to the individual species of the paper, which number 46, but the original discovery of *F. micrantha* in Britain by Gerard, suppressed in Johnson's edition and subsequently overlooked, was pointed out, and it was noted that the specimens of Ray's *F. major scandens flore pallidiore* in the Sloane Herbarium and in the Dubois Herbarium at Oxford are forms of *F. officinalis*, not of *F. capreolata* for which Ray's name is cited by Linnaeus.

We are glad to hear that Miss Carlotta Herring-Browne, who has been engaged for some years past in investigations into the life of John Bartram, the pioneer American botanist, has nearly completed her researches into the early records, including those in the British Museum at Bloomsbury and Cromwell Road and the Royal and Linnean Societies, and is now finishing her search at the Record Office. She hopes to have her volume ready for the printers shortly. As the dates of Bartram's life have often been misstated, it may be well to place the true dates on record. He was born on the 23rd March, 1699, near the village of Darby in Delaware County, Pennsylvania. The farm, which has now become Bartram Park, was bought by him in 1728, and lies near the junction of the Schuylkill and Delaware rivers. His stone house, built by his own hands, was finished in 1731. His thoughts were turned to botany in 1730, and in that year his friend James Logan procured for him a copy of Parkinson's "Theatrum." He was thereupon stimulated to travel after the plants and trees of his neighbourhood at a time when such journeys were difficult and dangerous. His house completed, he took to establishing native plants in his garden; in about 1734, on the suggestion of Benjamin Franklin, Bartram sent his diaries to Peter Collinson, and the interchange of letters and parcels of plants lasted till the death of Collinson in 1759. A few old trees due to these introductions still remain at Mill Hill, and some of the observations sent to London are preserved at the Royal Society or were printed in the *Gentleman's Magazine*. Bartram died on the 22nd September, 1777.

Botany figures largely in the April number of the *Journal of*

Genetics. Miss Edith R. Saunders continues her "Studies in the Inheritance of Doubleness in Flowers," dealing with the genera *Meconopsis*, *Althæa* (Hollyhock) and *Dianthus* (Carnation and Sweet William). Mr. E. C. Punnett contributes a note supplementary to his paper on "Reduplication Series in Sweet Peas," published in the same Journal for 1913. Mr. S. Ikeno has a long paper "On the Hybrids of *Capsicum annuum*"; and Mr. R. R. Gates writes on "Vegetative Segregation in a Hybrid Race"—*Œnothera rubricalyx* × *biennis*: the last two papers are illustrated.

Mr. Boulger publishes in *The Essex Review* for April the first part of an interesting account of the "Unpublished Material relating to John Ray," which he has found in the Bodleian Library. The material includes a manuscript sketch of Ray's life and numerous letters by Ray—twenty-six to Edward Lhuyd and fourteen to John Aubrey: the sketch is here reprinted, and from the letters numerous extracts with comments are given. A biography of Ray in the same library was transcribed by Dr. Andrew Clark and published in the same *Review* for October last: it is there erroneously attributed "to a supposed George Dale," but was the work of Samuel Dale, Ray's well-known contemporary.

The British Association has published a useful pamphlet on *The Utilisation and Improvement of Waste Lands* which contains abstracts of the following papers which were read last year at the meeting of the Association at Newcastle: "The Planting of Pit Mounds," by P. E. Martineau; "Maritime Waste Lands," by Prof. Oliver; "Utilisation of Northern Mountain and Heath Land," by Dr. W. G. Smith; "Waste Moorlands," by Prof. Bottomley; "Reclamation of Peat-lands in Carnarvonshire," by Prof. Lloyd Williams. Copies may be obtained on application to the office of the Association, Burlington House, W. 1.

We are glad to learn that the tablet which it was proposed to place on John Goodyer's house at Petersfield (see Journ. Bot. 1916, 375) has now been imbedded in the brickwork above the (modern) front door. The wording is

John Goodyer
Botanist and Royalist
(1592–1664)
lived here.

Mr. J. Ramsbottom, Assistant in charge of the Fungi in the Department of Botany, British Museum, has been appointed temporarily protozoologist to the medical staff at Salonica. The Trustees of the Museum have accepted Miss A. Lorrain Smith's offer to act as temporary assistant during Mr. Ramsbottom's absence, so that the work of the Department in dealing with enquiries, economic and otherwise, relating to the Fungi, will be continued without a break. Workers at the British Lichens will be glad to know that Miss Smith's revision of Vol. I. of Crombie's "Monograph" is now nearly complete and should shortly be ready for issue.

The *Garden* has recently printed a correspondence relating to the name Judas Tree, as applied to *Cercis Siliquastrum*, which Dr. Hemsley and Mr. H. S. Thompson contend should be construed as "the Tree of Judaea" and thus has no reference to Judas. Mr. Thompson cites in support of his view *Riviera Nature Notes* by "C. C."—*i. e.* the Rev. George Edward Comerford Casey (1846–1912)—a delightful book, the two editions of which were noticed in this Journal for 1899 (p. 95) and 1904 (p. 160) respectively. As was there shown, Mr. Casey's derivations of plant-names, Latin and English, were original rather than trustworthy, and there seems no reason for accepting his dictum in this case, although we have failed to find any legend which definitely connects the tree with the fallen apostle. According to the *Oxford English Dictionary*, the name first appeared in literature in 1668, but it will be found in Gerard's Herbal (1597): Gerard indeed seems to have bestowed the English name, and his reference to the legend shows that it then existed: "it is commonly called in Latin *Arbor Iudæ* . . . it may be called in English Iudas tree, whereon Iudas did hang himselfe, and not upon the Elder tree, as it is saide" (p. 1240). It may be noted that Gerard makes no reference to the occurrence of the tree in Syria; the localities he gives are all European. The elder-tree tradition is mentioned by Piers Plowman, and we have a record from Kent that the elder is still called Judas Tree in that county. For legends connecting the hanging of Judas with other trees reference may be made to *Plant Lore Legends and Lyrics* by Richard Folkard, p. 394 (1884). Parkinson (*Paradisus*, 1629) has a charming description of *Cercis* which, he says, "is generally in these dayes called *Arbor Iudæ*, and in English after the Latine name, untill a fitter may be had, Iudas Tree" (p. 438).

We have no intention of starting a "poets' corner" and have indeed more than once declined contributions in verse; but the following lines from the *Evening News* of April 21; commemorating as they do a plant not often sung and the extraordinarily late season which made it a conspicuous object up to the beginning of May on the railway banks round London, seem worth reprinting:—

"When spring at last is making good,
And mends her laggard pace,
Before the primrose by the wood
Has shown her pretty face,
I have a sure and certain sign—
The coltsfoot by the railway line.

"He has a rather tousled air,
His leaves are less than few;
But if he hasn't brushed his hair,
His face is washed with dew.
Like yellow gems his blossoms shine
Among the cinders by the line.

"He lives in places rude and waste,
As happy as may be;
Some say this shows a lack of taste—
I call it modesty.
I love this springtide pal of mine—
The coltsfoot by the railway line.
C. E. B."

TROPICAL AMERICAN RUBIACEÆ.—VIII.

By H. F. Wernham, D.Sc., F.L.S.

(Continued from Journ. Bot. 1916, p. 334.)

Further examination of the material in the National Herbarium has revealed the novelties described in the present paper, including two new genera, one from Guiana, the other from Brazil. The types of all the novelties described are in the National Herbarium.

Neobertiera, Rubiacearum e tribu Hameliearum novum genus. *Calycis* tubus campanulato-oblongus; limbi lobi 4 angusti pro rata subelongati, erecti, persistentes. *Corollæ* primo tubulosæ, demum verisimiliter hypocrateriformis (maturam non vidi), tubus gracilis staminum in regione paullum ampliatus, limbi lobos angustiusculos contortos subæquans. *Stamina* 4, infra corollæ fauces inserta; antheræ in tergo prope basin tamen in filamentum latum longiusculum fixæ, lanceolato-oblongæ. *Discus* conspicuus cylindricus glaberrimus. *Ovarium* biloculare; stylus validiusculus nec longus, stigmate in brachiis duobus latiusculis bifido; ovula in loculis pro tribu pro rata pauca. *Bacca* minima pisiformis, a calycis lobis persistentibus coronata, bilocularis; *semina* ± 10 per loculum, majuscula, globosa, conspicue punctata. Fruticuli v. arbores, ramulis teretibus. *Folia* opposita, breviter petiolata, membranacea, *stipulis* interpetiolaribus longe persistentibus. *Flores* secundi in cymularum thyrsis laxe dispositi parvi; bracteæ inter minimas.

This genus falls indisputably into the tribe Hamelieæ on the score of its fruit, seed, and corolla-characters, but it cannot be included with any genus yet described. The nearest ally is, perhaps, *Pseudohamelia* (Journ. Bot. l. (1912) 242), from which the present plant is readily separated by its contorted corolla, appreciably long filaments, glabrous conspicuous disc, and comparatively few and large globose seeds. The inflorescence is closely similar to that characteristic of *Bertiera*, § *Laxæ* (Journ. Bot. *l. c.* 113), from which I have derived my choice of a generic name. The new genus is, moreover, nearly allied to *Bertiera* also, but is readily separable by its flower-buds, tetramerous flowers and peculiar seeds.

Neobertiera gracilis, sp. unicum. Fruticulus 40–50 cm. altus, ramulis gracilibus densissime appresse hirto-hirsutis. *Folia* membranacea elliptica utrinque leniter angustata necnon acuta, utrinque præsertim in venis hirta, venis secundariis utrinque 9–12, petiolo brevi; *stipulæ* triangulares membranaceæ acuminatæ acutissimæ. *Flores* parvi graciles in cymarum thyrso laxissime dispositi sessiles v. brevissime pedicellati, cymulæ dichotomæ, ramulis gracillimis quâ ramuli vegetantes indutis, bracteis subsetaceis linearibus. *Calycis* lobi anguste lanceolati acutissime acuminati erecti; *corollæ* tubus extus sparsiuscule hirtus gracilis, lobos lanceolatos obtusos glabros subæquans, intus insuper præsertim hirtello-pubescens.

Hab. British Guiana, Macouria River (not far west of Cayenne), *Jenman* 2388!

A small, slender shrublet, some 18 ins. high. The *leaves* measure from 10–12 cm. × 3·5–4·5 cm., with stalks 4–7 mm. in length; *stipules* 4 mm. long, and 2 mm. or more in breadth at base. *Inflorescence* somewhat abbreviated, with flattened top and base 6–7 cm. wide; *bracts* 3 mm. long at most. *Calyx*-lobes 2 mm. long. *Corolla*-tube about 7 mm. long, lobes 6 mm. × 1·7 mm. *Anthers* 1·5 mm., filaments slightly shorter. *Disc* rather over ·5 mm. in height; *style* 1·6 mm. long, stigmatic branches ·7 mm.

Blandibractea, Rubiacearum e Rondeleticarum tribu novum genus.

Calycis tubus campanulato-infundibularis; limbi lobi 4 subæquales lati apice rotundati. *Corolla* demum late infundibularis, basin versus tamen valide tubulosus; limbi lobi 4 brevissimi latissimi apice truncato-rotundati, æstivatione imbricati, uno exteriore; tubus intus circa medium villosissimus. *Stamina* 4, paullo supra corollæ tubi medium inserta; antheræ breviter oblongo-ovatæ, dorsifixæ versatiles, longiuscule exsertæ; filamenta desuper validiuscula, pilosa, insuper angustata. *Discus* conspicuus, carnosissimus. *Ovarium* biloculare: stylus longiusculus exsertus apice breviter bifidus; ovula in loculis numerosa, conspicue funiculata, in placenta septo adnata plus minus immersa, horizontaliter affixa. Arbores *foliis* oppositis magnis crassiuscule chartaceis, *stipulis* mox deciduis. *Flores* inter minores, in cymis paniculatis laxiusculis amplis dispositi; *bracteæ* interdum in laminam petiolatam foliaceam amplam productæ.

In the absence of the fruit, the tribe to which this genus should be assigned is, strictly speaking, doubtful; but in view of the general facies, and of such other characters as are available for examination, I have little hesitation in relegating it to the *Rondeletiæ*, with *Warscewiczia* as its nearest ally. From the last-named this new genus is readily distinguished by its tetramerous flowers, structure of the corolla, insertion of the stamens, and, above all, by the nature of the "Schau-apparat" or attractive system of the inflorescence. In our genus this latter is provided by modified bracts, the calyx-lobes being approximately equal; in *Warscewiczia* the petaloid attractive-organs are, morphologically, calyx-lobes.

Blandibractea brasiliensis, sp. unicum. Arbor ramulis validis subtetragonis, glabratis cortice ruguloso conspicue lenticellato. *Folia* magna firme chartacea, nisi subtus in venis hic inde sparse minute puberula glabra, late obovata, apice vix acuminata obtusiuscula, basi truncata subcordata, venis præsertim centrali subtus prominentissimis petiolo brevi valido basi inflato; *stipulæ* caducissimæ (nec vidi). *Flores* pro rata parvi, breviter sæpius pedicellati, in paniculis dispositi amplissimis numerosissimi; novi tubulosi, maturi late infundibulares; *bracteæ* sæpe in laminam crassiusculam ellipticam productæ, glaberrimam, apice rotundatam basi cuneatam in petiolum gracilem elongatum necnon sublignosum venis valde conspicuis plus minus impressis.

Hab. Brasil without further locality, *Sello*! *Bowie & Cunningham* 10! 62!

A large-leaved stout tree, with *leaves* 19–45 cm. × 12–30 cm.

and probably much larger, with 20 pairs of prominent secondary veins on either side of the midrib; these are connected by fine but conspicuous veins at right angles; the stalks of the largest leaves named above are barely 3 cm. long. *Inflorescence*, ±25 cm. × 12 cm. Petaloid *bracts* 5–13 cm. × 2·5–6·5 cm., with stalk 3–5 cm. long. *Calyx*-tube (*ovary*) 2·5–3 mm. long; lobes 2 mm. × 1·5 mm. *Corolla*—lower, cylindrical portion of tube 3·5 mm. long, and over 2 mm. broad; upper, funnel-shaped portion, 4 mm. long, broadening to over 7 mm. in width. The corolla-lobes are almost negligible in length in the mature flower; in breadth they measure about 4 mm.; in fact, these lobes are almost obsolete at maturity, the corolla appearing like a funnel, with an entire rim and a short, cylindric, basal "spout" portion. *Filaments* exserted over 7 mm., bearing versatile anthers rather longer than 3 mm. The *style* is exserted somewhat less than the stamens.

The clavis of the genera, published in No. VII. of this series (Journ. Bot. 1916, p. 322), should be amended by the following additions to include the two genera described above:—

P. 329, from line 3. Stamens affixed in throat of short corolla, exserted. Flowers in cymes.
  Attractive organs of inflorescence modified calyx-lobes .... *Warscewiczia.*
  Attractive organs modified bracts .... *Blandibractea.*
P. 331, from line 15. Anthers included; inflorescence terminal.
  Corolla imbricate .... *Pseudohamelia.*
  Corolla contorted.
    Flowers 4-merous.......................... *Neobertiera.*
    Flowers 5-merous.......................... *Bertiera.*

THE GENUS SIPANEA.

This genus, together with its near ally *Limnosipanea*, is exceptional among the Rondeletieæ in being herbaceous. It was established by Aublet (Pl. Guian. i. 147) in 1775, who described the single species *S. pratensis*, discovered in Guiana. About a dozen species have been described since, all native in the American tropics, with the exception of *S. hispida*, which, like many other Brasilian species, has been found in Paraguay; K. Schumann, however, in the *Flora Brasiliensis* (VI. vi. 247 (1888)), recognizes two, only, beside *S. pratensis*, namely, *S. glomerata* H. B. K., and *S. biflora* Linn. fil. The remainder he includes in *S. pratensis*, with the exception of *S. veris*, a species collected in Matto Grosso and described by Mr. Spencer Moore in Trans. Linn. Soc. II. iv. 368 (1893); *S. erythrœoides* Cham., which he relegates to *Limnosipanea*; *S. radicans* Endl., synonymous with *S. biflora*; and *S. carnea* Neumann, in Rev. Hort. II. ii. 445 et tab. (1844), which he leaves without mention, possibly because this species was based on a plant grown from seed sent from an unnamed locality in South America.

The type of *S. pratensis* is in the National Herbarium; and an examination of the plentiful material there has led me to the conclusion that this species is clearly distinguishable from the more widely-distributed *S. hispida* Spruce MS. ex K. Schum. Fl. Bras. VI. vi. 250, with which Schumann confused it (*loc. cit.*).

The result of my examination of the material in the National Herbarium is displayed briefly in the following systematic account, which includes the description of six new species. The species are arranged as nearly as possible in order of relationship.

1. **Sipanea galioides**, sp. nov. *S. pratensis* Oliv. (not of Aublet) in Trans. Linn. Soc. II. ii. (1886) 276. Herba gracilis, *caulibus* insuper sæpe tenuissimis, appresse hirtello-pubescentibus. *Folia* angusta, linearia vel lineari-lanceolata sæpius obtusa sessilia, firme chartacea, utrinque subtus tamen densius præsertim in venis hirtella; *stipulæ* breviusculæ triangulares acuminatæ acutæ. *Flores* 1–3 in cymulis capitatis terminalibus dispositi. *Calycis* lobi lineares, acuti; *corollæ* tubus gracilis, extus insuper sericeus infra sæpius glabratus, lobi late ovati acutissimi brevissime acuminati, utrinque glabri.

British Guiana: Spelemoota, Arapoo River, Roraima, *Im Thurn* 29! 1st December, 1884.

Leaves, 19–31 mm. × 4–6 mm.; *stipules*, ± 4 mm. long. *Calyx*-lobes 6 mm. *Corolla*-tube, 18 mm. or longer; lobes, 9 mm. × 6·5 mm.

Distinct from all the other species in its very narrow, *Galium*-like leaves, and its ample corolla-limb.

2. **Sipanea Spraguei**, sp. nov. *S. acinifolia* Benth. ex Sprague in Trans. Bot. Soc. Edinb. xxii. 433 (1904), ex parte; Wernham in Kew Bull. 1914, 64. Herba inter humillimas, caulibus tenuibus procumbentibus, in nodis inferioribus radicantibus, infra glabrescentibus apices versus minute hirtellis; *folia* parva elliptico-lanceolata subsessilia sæpius subobtusa, vix acuminata supra sparsiuscule hirtella nonnunquam subglabra, subtus similiter nisi sæpius in venis densius induta; *stipulæ* obsoletæ. *Flores* sessiles, nisi in ore et faucibus aurantiaco-villosi glabri, solitarii caules adscendentes terminantes. *Calycis* lobi erecti lineares acutissimi in corollæ tubum stricte adpressi, pro rata breves. *Corollæ* tubus gracilis, insuper parum ampliatus, lobi late obovati apice rotundati, tubi dimidium superantes.

Venezuela: Orinoco R., Caicara, November 1898, in savanna near a clump of moriche palms, *Sprague* 7!

Allied to *S. acinifolia* Sprague (= *S. veris* S. Moore), to which I originally assigned it (*loc. cit. supra*), but it is readily separable from that species in consideration of its much smaller size, smaller leaves, shorter calyx, and relatively much larger corolla-limb. *Leaves* 5–8 mm. × 1·5–2·5 mm. *Calyx*-lobes 3·5 mm. *Corolla*-tube 12 mm.; lobes 8·5 mm. × 5·5 mm.

3. **Sipanea veris** S. Moore in Trans. Linn. Soc. II. iv. 368 (1893). *S. acinifolia* Benth. ex Sprague in Trans. Bot. Soc. Edinb. xxii. 433.

Brasil: Matto Grosso, Rio des Bugres, October, *Spencer Moore* 435! Parà, near Santarem, *Spruce*!

4. **Sipanea biflora** Linn. fil. Suppl. 134; Cham. & Schlecht. in Linnæa, iv. 168.* *S. radicans* Endl. Atact. vii. t. 7. *Rondeletia biflora* Rottb. Pl. Sur. vii. t. 2. f. 2.

Guiana: *Dahlberg*! *Hostmann* 1121; Venezuela:—Orinoco R., near Maypures, *Spruce* 3620! Brasil: *Sello*! *Blanchet* 1439!

5. **Sipanea pratensis** Aubl. Pl. Guian. i. 147, t. 56. *S. dichotoma* H. B. & K. ex Benth. in Hook. Journ. Bot. iii. 218.

Guiana: *Aublet*! *Schomburgk* 15! 95! *Splitgerber* (Herb. De Vriese)! *Berthoud Coulon* 176! Trinidad: in grassy places near La Bray.

This species, the type of the genus, may be regarded as the parent-species of the four preceding, which, like it, are more or less slender and even delicate plants, inclined to creep or straggle, smooth and tending to glabrousness; they are distinguished also by the relatively large corolla-limb. The remaining species are loosely connected with the above group by way of *S. glabrata*, about to be described. They form a group with *S. hispida* in the centre, being coarser, more or less hispid plants, more or less rigidly erect and branching from the base, with characteristically small corolla-limb.

6. **Sipanea glabrata**, sp. nov. Herba parva e basi ramosa, caulibus plus minus virgatis in nodis tumidis densiuscule appresse pubescentibus. *Folia* latiuscule lanceolata utrinque acuminata acuta, supra nisi in venis minute hirtella glabra, subtus in venis densius hirtella aliter glabrata, brevissime petiolata; *stipulæ* obsoletæ v. brevissime setaceo-acuminatæ. *Flores* parvi in cymulis in anthesi subcapitatis demum laxescentibus 5–6-floris dispositi. *Calycis* lobi sparsissime hirti, nonnunquam fere glabri lineares acuminati. *Corollæ* tubus extus infra glaber insuper griseo-pilosus parum ampliatus, lobi late necnon breviter ovati apice rotundati. *Capsula* (immatura) densissime sericeo-pilosa, calycis lobis fere glabris persistentibus coronata.

Brasil: Matto Grosso, S. Anna da Chapada, 28 June, 1902, *Robert* 333! 364!

Leaves ± 4 cm. × 1·2 cm. *Calyx*-lobes 3·5 mm. *Corolla*-tube 1 cm.; lobes, 2 mm. × 2·7 mm. Allied to *S. hispida* Spruce, but easily distinguished by the nearly glabrous leaves, the obsolete stipules, and the very small corolla-limb, barely half a centimetre in diameter.

7. **Sipanea hispida** Benth. MS. in Herb. Mus. Brit. *S. pratensis* K. Sch. in Mart. Fl. Bras. VI. vi. 249 (non Aubl.).

Herba hirsuta erecta, paullo ramosa, caule crassiuscula, basi sublignoso, insuper dense hispidulo. *Folia* papyracea, elliptico-lanceolata, acuminata apice acuta, basi acuta, utrinque præsertim in venis subhispido, venis secundariis utrinque 5–8, subsessilia nonnunquam brevissime petiolata; *stipulæ* e basi lato breviter oblongo subito in acuminem longiusculum productæ. *Flores* in capitulis primo inter minores 5–12-floris, demum in cymis elongatis plus minus secunde dichotomis dispositi, *bracteis* linearibus v. lineari-lanceolatis simplicibus. *Calycis* lobi lineares acutissimi pilosi tubo densissime sericeo. *Corollæ* tubus breviusculus extus basin versus pilosus, insuper glabrescens limbus patens nec latus, lobis glabratis rotundatis. *Fructus* densissime sericeo-villosus calycis lobis coronatus persistentibus.

Brasil: Rio Negro, near San Gabriel de Cachoeira, *Spruce* 2051! Moist campos, Goyaz, November, *Gardner* 3224! Matto Grosso, *Spencer Moore* 801! Peru: near Tarapoto, *Spruce* 4602! Bolivia: Mapiri, 2500 feet, May, *Rusby* 2461! N. Paraguay: *Hassler* 7733! between R. Apa and R. Aquidaban, February, *Fiebrig* 4799! S. Paraguay: Maracayu, *Hassler* 5961! (v. *S. pratensis, supra*).

Leaves, ± 6 cm. × 2 cm., with stalks not exceeding 5 mm.; *stipules*, broad base 2·5 mm., acumen. ± 5 mm. *Calyx*-lobes, 3–4 mm. long. *Corolla*-tube, 6–8·5 mm.; lobes, 3 mm. × 2 mm., rarely larger.

8. **Sipanea Trianæ**, sp. nov. Herba verisimiliter prolixe repens, omnino molliter patento-pilosa, caulibus gracilibus elongatis. *Folia* inter minora, ovata vix acuminata subacuta, brevissime petiolata v. subsessilia; *stipulæ* e basi brevissimo triangulari in setam productæ. *Flores* pro genere minimi in cymulis densiuscule congesti primo sub capitatis, demum dichotomis laxiusculis secundi. *Calycis* lobos setaceos dense villosos *corollæ* tubus vix superans extus dense pilosæ, limbus patens parvus.

Colombia: *Triana* 1776!

Leaves, 19–28 mm. × 10–15 mm.; *stipules* (seta) 5 mm. *Calyx*-lobes, 3 mm. *Corolla*-tube 4 mm.; limb 3·3 mm. in diameter.

Related to *S. hispida* Spruce, but quite distinct in the leaf-shape and in the small, inconspicuous flowers.

9. **Sipanea brasiliensis**, sp. nov. Herba parva hispidulo-villosa, caulibus adscendentibus. *Folia* inter minora elliptico-lanceolata acuminata sæpius acuta, sessilia; *stipulæ* in vaginam brevem persistentem connatæ nec setosæ. *Flores* in cymulis paucifloris terminalibus aggregatæ; *calycis* lobi lineares acutissimi, in fructu decidui; *corollæ* tubus inter breviores, circa medium inflatus, insuper patente-pilosus, subtus glabrescens, lobi late ovati, glabri. *Capsula* minima pubescens.

Brasil: Minas Geraes, on a dry bank near Sabara; fl. and fr. September; *Gardner* 5009!

Leaves 14–20 mm. × 4–7 mm. *Calyx*-lobes, 3 mm. *Corolla*-tube, 1 cm.; limb, 7 mm. in diameter.

Simply distinguished from its nearest ally, *S. hispida*, by its small size—attaining only 3 or 4 inches in height—the small leaves, and very small, uncrowned fruits. The dehisced capsule is barely 5 mm. in length, each valve being only 2·5 mm. in its greatest width.

10. **Sipanea colombiana**, sp. nov. Herba pedalis simplex nec ramosa, gracili sparse griseo-hirtello. *Folia* sessilia v. subsessilia, oblonga nec acuminata apice subacuta, utrinque minute necnon sparse nisi in venis densiuscule hirtello-pubescentia; *stipulæ* parvæ triangulares nec setaceo-acuminatæ. *Flores* in cymulis parvis capitatis terminalibus alaribusque ± 10-floris congesti, *bracteis* foliis similibus multo tamen minoribus. *Calycis* lobi pro genere latiusculi necnon breviusculi lineares, persistentes. *Corollæ* tubus extus fere glabræ super medium limbi basin versus leniter ampliatus, lobi elliptico-obovati obtusi

patentes. *Capsula* inter minima obtuse costata, sparse griseo-pilosa, calycis lobis aliquanto accrescentibus glabrescentibus coronata.

Colombia: Province of Ocaña, Crecenoche, 900 feet; fl. May. *Schlim* 548!

A short erect unbranched herb—apparently annual. *Leaves* not more than 4 cm. long and 1·4 cm. broad. *Calyx*-lobes, in the flower, 2·5 mm.; in the fruit, barely 4 mm. long. *Corolla*-tube, 13–14 mm. long, and over 2 mm. wide at the mouth; lobes, 7 mm. × 5·2 mm.

Allied to the Guianan *S. pratensis*, from which it differs in the sessile, oblong, non-acuminate leaves, the short, relatively broad calyx-lobes, and the very small capsule, which is barely 4 mm. long at maturity.

The types of the following species I have, unfortunately, had no opportunity of seeing:—

S. glomerata H. B. K. Nov. Gen. & Sp. iii. 398. K. Schumann distinguishes this sharply from *S. pratensis* on the grounds of its leathery corolla, tripartite external bracts, and lengthily acuminate silky leaves. He quotes *Spruce* 3665, from Maypures, as an example. It is probably a distinct species.

S. trichantha Miq., in Linnæa xviii. 293, is stated by the author to have its nearest ally in *S. glomerata* H. B. K., from which he distinguishes it by the leaf-shape (". . . infimis ellipticis reliquis lanceolatis . . . .") and the corolla (". . tubo longe villoso et simul breviore certe sui juris."). The habitat is given as "in Surinamo copiose . . ."; and it would appear to be a form of variety of *S. pratensis*, essentially a Guianan species.

S. vinca Mart. ex K. Sch. in Fl. Bras. VI. vi. 250, identified by Schumann with *S. pratensis*, may be *S. hispida*.

S. carnea Neumann in Rev. Hort. II. ii. 445 (cum tab.) has been referred to above.

CEPHALANTHUS IN AMERICA.

This genus of *Naucleæ*, according to Haviland's excellent monograph in Journ. Linn. Soc. xxxiii. (1897) 38, is represented in the New World by five species, namely:—*C. salicifolius* Humb. & Bonpl., confined to Mexico; *C. Savandi* Cham. & Schlecht., native in Brasil, Paraguay, and parts of the Argentine; *C. peruvianus* Spruce, and *C. breviflorus* Spruce, each represented by a single specimen from Tarapoto; and *C. occidentalis* L., widely distributed over India and S.E. Asia, and over North America from Canada to California. Haviland identifies a Cuban plant (*Wright* 2758) with this species, and one or two Mexican specimens also. I find, however, from an examination of the material in the National Herbarium, that the Mexican specimens are quite distinct from *C. occidentalis*. The following novelties have apparently escaped notice hitherto:—

Cephalanthus Berlandieri, sp. nov.

Frutex ramulis teretibus lævibus gracilibus glaber. *Folia* 3-verticillata elliptica papyracea leniter acuminata apice subobtusa basi cuneata breviter petiolata, venis secundariis utrinque 7; *stipulæ* mox deciduæ triangulares. *Capitula* inter minores in axillis solitaria superioribus ramulos necnon terminantia, pedunculis rectis gracilibus. *Calycis* extus pilis perpaucis nonnunquam hic inde hirti aliter glabri lobi lati rotundati obscuri; *corollæ* inter brevissimas tubus gracilis extus glabræ, lobi oblongi concavei apice rotundati; stylus longe exsertus.

Mexico: Bejar, *Berlandier* 1620!

Leaves, ± 8 cm. × 3 cm., with petiole not exceeding 7 mm. *Stipules* ± 3 mm. long. *Peduncles* ± 2·5 cm. *Calyx*, 2·5 mm. long. *Corolla*-tube 3–3·3 mm. long; lobes barely 1·5 mm. Style exserted up to 1·5 mm. *Heads*, not reckoning the corollas, 7 mm. in diameter.

This species is at once distinguishable by the remarkable shortness of the corolla, as well as by the small size of the heads. The sheet in the National Herbarium, bearing the above type, contains also a plant collected in Texas by Berlandier (No. 1737), named "*Cephalanthus occidentalis β. brachypodus* DC." The flowers upon this latter specimen are, however, too young for the species to be identified; and in any case the description of the variety in question (DC. Prodr. iv. 539) is inadequate altogether. The Texas plant is probably a variety of *C. occidentalis*; it is not identical with my new Mexican species.

Cephalanthus Hansenii, sp. nov.

Frutex glaberrima, ramulis teretibus striato-lævibus virgatis subherbaceis. *Folia* membranacea ternatim verticillata, latiuscule lanceolata utrinque acuminata apice acutissima, venis secundariis utrinque 4–5, petiolo brevi; *stipulæ* herbaceæ triangulares acutæ caducæ. *Capitula* inter majores in cymis umbellatis terminalibus disposita necnon axillares solitaria. *Calyx* extus nisi hic inde 2–3-pilis hirtellus glaber, lobis oblongis apice rotundatis. *Corollæ* tubus inter longiores, lobis erectis planis oblongis apice rotundatis.

California: Amador Co., Crow Point, 1500 ft., July, *Hansen* 1163! Mexico: Chihuahua, San Diego Canyon, Sierra Madre Mts., 6400 ft., 16 September, *Jones*!

This species differs from both its nearest allies, *C. occidentalis* and *C. salicifolius*, especially in the much greater length of the corolla-tube, as well as in the shape of the *leaves*. The latter measure about 8 cm. × 2·4 cm. on an average, with stalks not exceeding 7 mm. in length, and *stipules* 3 mm. long and 3 mm. broad at the base. *Heads*, about 8 mm. in diameter, exclusive of the corollas. *Calyx* 3 mm. long. *Corolla*-tube 11–12 mm. long; lobes 1–8 mm. long. Terminal peduncles, 4·5 cm. long.

Cephalanthus peroblongus, sp. nov.

Frutex ramulis virgato-rectis novellis minute puberulis. *Folia* ternatim verticillata subcoriaceo-chartacea, oblonga basi subito acuta apice vix acuminata leniter rotundata, subtus præsertim in venis puberula, supra subnitentia glabra, venis secundariis utrinque 5–6, petiolo puberulo brevi; *stipulæ* parvæ triangulares acutæ. *Capitula* terminalia necnon in axillis solitaria pedunculis rigidulis sublignosis. *Calyx* dense griseo-sericeus, tubo sulcato, obsolete lobatus. *Corollæ* tubus gracillimus extus subglaber, insuper sub limbo subito ampliatus, lobis oblongo-orbicularibus subpatentibus apice rotundatis.

Mexico: on loam, in moist ravines, Tepic, May, *Barclay* 1193!

A shrub 6 ft. high, with white flowers. *Leaves*, about 8 cm. × 2 cm., with petiole not exceeding 4 mm. *Heads*, 8 mm. in diameter, exclusive of the corollas. *Calyx* 2·5 mm. long; *corolla*-tube 6–8 mm. long; lobes 1·5–2 mm. Quite distinct in its leaf-shape and texture, and in the indumentum of the calyx.

NOTES ON NOMENCLATURE.

By James Britten, F.L.S.

I. The Restriction of Names "ex loco."

In the course of his paper on *Viola montana* (Journ. Bot. 1916, 260) Mr. Wilmott calls attention to a point which seems to merit more attention than it has received. The passage is likely to be overlooked, and it appears worth while to reprint it. "The using of local floras to precise names 'ex loco' is," he says, "illogical. Obviously the author of a local flora is, in a sense, only dealing with those forms of the species which grow in his area, but he cannot in any sense be regarded as restricting the name to those forms . . . . Names in local floras, unless the contrary is definitely stated, are to be regarded as identifications, the author merely referring his plant to a known species." Mr. Wilmott takes as an illustration of his view the position assigned to *Adonis annua* in the British Museum *List of Seed-Plants*, in which I fear Dr. Rendle and myself acted in contravention of this principle: "Hudson (1762) Fl. Angl. p. 209 has (see Journ. Bot. 1907, p. 435) been regarded as restricting the name *Adonis annua* to the only British species, viz. *A. autumnalis*. This is not so. All that Hudson meant is 'The British *Adonis* belongs to *A. annua* Linn., other varieties of which occur outside Britain.'"

I had expressed the view stated by Mr. Wilmott with some clearness in this Journal for 1907, p. 283, in the course of a review of Mr. Druce's account of *The Dillenian Herbarium* in which he applied Hill's name *Helleborine* to the genus hitherto known as *Epipactis*. My reasons against this now appear to me so cogent that I am puzzled to explain my later concurrence in Mr. Druce's defence of his position in adopting *Helleborine* (see Journ. Bot. 1908, 8–10), although in a note to this paper I stated that I still retained the conviction "that Hill intended to restore the name as an equivalent of the Linnean genus *Serapias*, as indeed his words indicate" (*loc. cit.* p. 10). Mr. Druce points out that *Helleborine*, as defined by Hill, excludes the species now included in *Serapias*: the phrase, "The leaves are broad and nervous, and the root is composed of interwoven fibres" is not applicable to *Serapias* as now understood. Nevertheless, Hill's words—"[Linnæus] takes away the received name [*Helleborine*] and calls it *Serapias*"—make it quite evident that Hill regarded the names as equivalent, although he naturally limits his description to the British species, with which alone he was concerned. In Journ. Bot. 1912 (p. 257) Mr. Druce has a further note in support of *Helleborine.*

II. Filix "Hill.

Mr. O. A. Farwell sends me a reprint of a paper entitled "Fern Notes" which he contributed to the Eighteenth Annual Report of the Michigan Academy of Science (December 1916, pp. 78–94). In this he proposes to employ generically the name *Filix*—which, as he points out, has already been adopted by Underwood and others, on the ground of its employment by Adanson (1763) in that sense for Bernhardi's *Cystopteris,*—basing his proposition on its use by Hill in 1755.

At the outset it may be of interest to note that this is not the first edition of Hill's work, which was published anonymously in the preceding year—1754: we have a copy of this in the Department of Botany, but it is noticed neither by Pritzel nor Jackson. The 1755 issue was printed from the same plates and differs from the first only by the addition of a dedication of four pages—"To the Honourable the Lady Betty Germain," whose virtues are fulsomely narrated although Hill styles himself "a stranger" to her,—with the author's name, the date, and the words "second edition," which last seem to have escaped the notice of the bibliographers mentioned. In our copy of the 1754 issue, at the end of the preface, is a note in Hill's hand which announces as forthcoming his *British Herbal*: "January 24th, 1756. No. 1 To be continued Weekly and to be Published in 50 Numbers to Consist of one Volume folio 6*d* each Number": the numbers were actually 52.

I find it impossible to discover on what ground Mr. Farwell bases his conclusion that Hill intended to establish a genus, nor do I see that his quotations from Hill's preface have any bearing on the matter. Mr. Farwell rightly points out that "the Latin names are either uninomials, binomials, or polynomials" and that "the work contains no generic descriptions as such": this being so, how can we recognize as a genus of Hill what he certainly never thus defined? Mr. Farwell's reasoning is ingenious rather than convincing: having first laid down that "the names Filix mas and Filix fœmina as here used by Hill must be considered as true binomials"—a statement to which I demur—he proceeds to build on this assumption thus: "Since the binomial has been effectively published it follows that each element of the binomial, that is to say, that the generic name and the specific name each has been effectively published and the proper citation for the genus is Filix (Fuchs) Hill, [Useful] Family Herbal, 171, 1755."*

Again, Hill applies the name *Filix* to two plants now universally regarded as generically distinct: Filix mas (=*Lastrea Filix-mas*) and Filix (or, as he prints it Felix) fœmina (=*Pteris aquilina*). Mr. Farwell restricts the name to the former genus, presumably on the ground of "priority of place"—a principle which, if carried out, would lead to astonishing results: *e. g.* those who, following most systematists, unite *Amygdalus* with *Prunus* would, if they adopted this principle, if it may be so styled, have to rename all the species of the latter under the former name. This would afford a grand opportunity for the makers of "new combinations," among whom we regret to see Mr. Farwell must be numbered: no fewer than 27 such names are indicated as "N. Comb." as a sequel to his adoption of Hill's alleged genus. This haste to invent new names—which some uncharitably suggest is prompted by a desire to immortalize one's own—is surely to be deprecated.

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* This by the way it certainly is not: the page is 141.

III. THE GENERIC NAMES IN L. SP. PL. ed. 2.

I may take this occasion for calling attention to a point of nomenclature which is insufficiently provided for by the Vienna Code. Art. 19 says: "It is agreed to associate genera, the names of which appear in [*Species Plantarum*, ed. 1] with the descriptions given of them in the *Genera Plantarum*, ed. 5 (1754)." This makes no provision for the names added in ed. 2 of the *Species* (1762), which must in like manner be associated with ed. 6 of the *Genera* (1764), as indeed is indicated by Linnæus himself in the preface: "Genera nonnulla *nova*, nonnulla *immutata* adhibui; quæ in nova editione Generum plantarum propediem sistere animus est." An example of the cases where such provision is necessary will be found in *Pæderota*, of which two species are indicated in Sp. Pl. ed. 2, p. 20, the first description of the genus occurring in Gen. Pl. ed. 6, p. 12. This is not parallel to the case of *Nolana prostrata* (Linn. f. Dec. t. 2) and to others of the kind here, although no generic character is given. The description contains full generic characters; the describers of later species, recognizing the genus, give characters which separate these from the one described with the genus. The converse method is followed by Miller (*Abridgement* ed. 6), who describes the genus *Walkeria* (=*Nolana*) but names no species. It may be noted here that the name *Nolana* is cited by the Kew Index from "Linn. Sp. Pl. ed. 2, 202 (1762)." Here there is no description, but a reference is given to "Linn. dec. i. t. 2," with a note "Plantæ figuram et descriptionem dedit Filius in Decuria plant. 1762." In the *Decas*, however, the younger Linnæus attributes the name to his father: "Cum absolute hæc planta novum constitueret genus, eam Parens Carissimus *Nolanam* nominavit, a Nola s. campanula derivatum." The preface to the *Species* is dated 1 Sept. 1762; that to the *Decas* bears no date, though the title page gives 1762. Whether the name should be cited as "L." or "L. ex L. f." is therefore doubtful, but in any case Linnæus seems responsible for the name.

SOMERSET PLANT-NOTES FOR 1916.

By the Rev. EDWARD S. MARSHALL, M.A., F.L.S.

ALTHOUGH the number of our local field-workers and the extent of their excursions were rightly reduced by the state of public affairs, last season in the County was by no means without botanical results. Mr. N. G. Hadden did successful exploring around Porlock;

Messrs. W. D. Miller, W. Watson, and others added to their previous valuable contributions: and Lady Davy, during a short stay on Exmoor, found several noteworthy species. I have also received notes from Messrs. H. S. Thompson and E. J. Hamlin.

Districts 1 to 4 and 6 are in v. c. 5 S. Somerset; the rest belong to v. c. 6 N. Somerset. An asterisk indicates a new vicecomital record. A note of admiration means that I have seen the plant *in situ*.

Ranunculus trichophyllus Chaix. 8. West of Edington Junction!, *Watson*.—*R. Drouetii* F. Schultz. 2. Roadside ditch, Holnicote, *Hadden*.—*R. Baudotii* Godr. 2. Ditches on the Porlock-Bossington marshes, *Hadden*.—*R. homiophyllus* Ten. (*Lenormandi* F. Schultz). 3. Hawk Moor (in Otterford Parish); and 6. Near Churchstanton, *Miller*.—*R. auricomus* L. 10. Common at Chewton Mendip, *Tucker*.

Helleborus viridis L. 4. About a dozen plants, above South Hill Farm, Staple Fitzpaine, *Miller*.—*H. foetidus* L. 10. Lilycombe, near Litton, *Tucker*.

Aquilegia vulgaris L. 1. Truly wild, on a moor between East Anstey and Dulverton, but very local. 2. A few plants, near a ruin, in The Parks, Porlock; clearly not native, *Hadden*. 3. Blagdon, near Pitminster, *Watson*.

Nymphaea alba L. 3. Pond on Widcombe Moor, north of Churchstanton; but doubtless planted.

Meconopsis cambrica Vig. 9. In two places below Callow Rocks, near Sidcot, *Thompson*.

Fumaria capreolata L. (*pallidiflora* Jord.). 2. Kilve; and 8. Burnham, *Watson*.

Nasturtium sylvestre Br. 8. Locally plentiful on the peat-moor, west of Edington Junction.—*N. amphibium* Br. 10. By ponds off Field Lane, Chewton Mendip, *Tucker*.

Arabis hirsuta Scop. 10. Chewton Mendip; not common, *Tucker*.

Draba muralis L. 10. Walls along Field Lane and off Watery Combe, Chewton Mendip, *Tucker*.

Sisymbrium Thalianum Gay. 6. Combe St. Nicholas.

Diplotaxis muralis DC. 10. An abundant weed in the grounds of Chewton House, Chewton Mendip, *Tucker*.

Coronopus didymus Pers. 2. Porlock Weir, *Hadden*.—*C. procumbens* Gilib. 10. Chewton Mendip, *Tucker*.

Lepidium ruderale L. 5. East Quay, Bridgwater, *Hamlin*.—*L. Draba* L. 2. Now plentiful by a roadside at Minehead, *Hadden*. 3. By the Parret, Bridgwater, *Hamlin*. 10. At the South-Western Railway Station, Midsomer Norton, *Thatcher*.

Teesdalea nudicaulis Br. 2. In good quantity by the roadside, Porlock Hill, *Hadden*. Many hours' search failed to detect it in its only other known Somerset locality (*Miller*).

Cakile maritima Scop. 3. Shore, near the Golf Club-house, Minehead Warren, *Hadden*.

Raphanus Raphanistrum L. 2. Field near Bossington, *Hadden*. It seems to be very uncommon in the southern districts.

Viola palustris L. 1. Simonsbath, *Davy*. 6. Widcombe Moor, and near Combe St. Nicholas. 10. By Bishop's Ponds, Eaker Hill Woods, Chewton Mendip, *Tucker*.

**V. epipsila* Ledebour. In my *Supplement* I suggested that this should be searched for on Exmoor, not knowing that it had already been found there; it may prove to be frequent on the moors in the south-west. An addition to the County list.—1. North end of Pinkery Pond (fountain-head of River Barle), near Simonsbath, at 1450 feet; the type, together with forma *glabrescens* Ascherson & Graebner and *V. epipsila* × *palustris* (all named by Mrs. Gregory), August 8, 1911, *W. P. Hiern*. 3. In bogs and moist woods on Blackdown, near West Buckland. 6. Widcombe Moor (type; forma *glabrescens*; and forma *minor* Gregory).

Polygala oxyptera Reichb. 2. Culbone Woods, and near Greenaleigh, Minehead, *Hadden*.—*P. serpyllacea* Weihe. 1. Simonsbath, *Davy*, sp.

Saponaria officinalis L. 6. Combe St. Nicholas, *Watson*.

Silene latifolia Rendle & Britten, var. *puberula* (Jord.). 2. Lane near Bossington, *Hadden*.—*S. latifolia* × *maritima*. 9. Blagdon-Mendip; sent fresh by Mr. Britten, together with a small *S. maritima*, which fairly well answers to the description of var. *parvifolia* Druce. *S. cretica* L. Mr. Wilmott of the National Herbarium refers to the type the Milverton clover-field plant, queried as var. *annulata* (Thore) in last year's Notes (p. 97).

Lychnis alba × *dioica*. 2. Bossington, *Hadden*. *L. Githago* Scop. 2. Porlock, *Hadden*. 10. Frequent in cornfields on the Hallatrow and Wells roads, Chewton Mendip, *Tucker*.

Stellaria Dilleniana Mœnch. 8. The *green*-leaved form (much the scarcer in Britain, and not previously noted in Somerset) occurs in a small swamp by the railway-line to Highbridge, W.N.W. of Edgington Junction, *Watson*! It grows with our usual form (*S. glauca* With.), which is frequent thereabouts; and I could find no difference between the two, excepting the colour of their foliage.

Arenaria leptoclados Guss. 8. Sandhills, north of Burnham; both type and var. **viscidula* Rouy & Foucaud, but not plentiful.—*A. verna* L. 10. In several places, Chewton Mendip, *Tucker*; probably extending into dis. 9, as he informs me that the Mineries Bog and Chewton Warren are both in this parish. *A. serpyllifolia* L., var. **viscidula* Roth (*glutinosa* Koch). 8. Sandhills, north of Burnham. 9. Berrow sandhills. Purn Hill, Bleadon, *Thompson*, sp.

Sagina subulata Presl. 4. Britty Common, above Staple Fitzpaine.—*S. nodosa* Fenzl. 9. Charterhouse-on-Mendip, *Miss Roper*. Burrington, *Thompson*.

Spergula arvensis L. 2. A common weed on hill-farms about Porlock, *Hadden*. 8. Near Edington Junction, *Watson*. 10. Cornfield near West End, Chewton Mendip, *Tucker*.

Montia fontana L. 1. Exton (var. *rivularis*); and 6. Widcombe Moor, *Watson*.

Hypericum Androsaemum L. 2. The Parks, Porlock, *Hadden*.—*H. humifusum* L. 3. Road-cutting, Gotton, West Monkton, *Miller*.—*H. elodes* L. 1. Simonsbath and Withypool. 6. Otterford, *Watson*.

Malva moschata L. 2. Monksilver; 6. Castle Neroche, *Watson.* 10. Remarkably common at Chewton Mendip; much more so than *M. sylvestris. Tucker.*

Linum bienne Mill. (*angustifolium* Huds.). 2. Porlock Marsh, *Hadden.*

Radiola linoides Roth. 2. Holford, *Hamlin.*

Geranium phaeum L. 2. Established at Lower Vexford," Stogumber, *Dr. C. R. Killick*, sp.—*G. pratense* L. 10. Chewton Mendip; abundant, *Tucker.*—*G. pyrenaicum* Burm. fil. 1. Winsford, *Watson.* 2. Dunster, *Hamlin.* – *G. columbinum* L. 2. Oareford, *Hadden.* 3. Badger Street, *Watson.* 4. Staple Fitzpaine, *Miller.*

Erodium moschatum L'Hérit. 2. Bossington Marsh; plentiful, *Hadden.*

Oxalis Acetosella L., var. *subpurpurascens* DC. 2. Culbone Woods, *Hadden.*

Genista anglica L. 1. Beer Moors, between East Anstey and Dulverton. 4. Staple Hill, *Miller.*—*G. tinctoria* L. 3. By the second milestone, on the road from Taunton to Corfe, *Miller.* 10. Field off Watery Combe, Chewton Mendip; very abundant in fields off Primmerfield Lane, near Litton, *Tucker.*

Cytisus scoparius Link. 2. Hawkcombe, *Hadden.*

Ononis spinosa L., var. **mitis* (L.)? 5. I have no specimen of this for comparison; but a spineless plant, found by my wife on the Lias, north of Somerton, appears to belong to it.

Trigonella ornithopodioides DC. 2. Selworthy Green, *Hadden.*

Trifolium medium L. 2. Between Porlock and Horner, *Hadden.* 3. West Buckland.—*T. striatum* L. 10. Chew Down, Chewton Mendip, *Tucker.*—*T. glomeratum* L. 2. On shingle, between Bossington and Hurlstone Point, *Hadden.*

Anthyllis Vulneraria L. 10. One plant, Chewton Mendip, *Tucker.*—Var. **pulchella* Vis. (*A. communis* Rouy, var. *pulchella* Rouy & Foucaud, *Fl. de France*, iv. 287)? 8. Sandhills, north of Burnham—the only form which I saw there. Remarkable for its slender, trailing habit; small, yellow flowers, often with a reddish keel; and especially for its *bicolorous* calyx (upper part purplish red), clothed with spreading, silky, white hairs.

Ornithopus perpusillus L. 1. Cow Castle, near Simonsbath, *Lady Davy.*

Vicia tetrasperma Moench. 2. Porlock, *Hadden.*—*V. gracilis* Lois. 3. Thurlbear, *Watson.*—[*Vicia macrocarpa* Bert. (*V. Morisiana* Jord.; *V. sativa*, var. *macrocarpa* Moris). 10. Cornfield, Chewton Mendip, *Tucker.* This was sent to me fresh, and seemed to agree with Rouy's description; the name was afterwards confirmed at Kew. A handsome Vetch, looking like a magnified *V. sativa* L.].—*V. lathyroides* L. 2. Minehead Warren, *Hadden.* Its having been so long overlooked in such a well-worked place is odd.

Lathyrus Nissolia L. 3. By the canal at Charlton; also near the third milestone, on the road from Taunton to Corfe, *Miller.*—*L. montanus* Bernh. var. *tenuifolius* (Roth). 1. Between East Anstey and Brushford.

Spiraea Ulmaria L., var. *denudata* Boenn. 2. Porlock; Oare, *Hadden.*

Rubus pyramidalis Kalt. 1. A small form of this (*teste Rogers*) occurred in open woodland by the Barle, between Hawkridge and Dulverton.—*R. rosaceus* Wh. & Nees (type). 5. Borders of Copley Wood, Somerton (confirmed by *Rogers*).

Alchemilla vulgaris L. (aggregate). 2. Oareford, *Hadden.*

Rosa tomentosa Sm. (aggregate). 10. Chewton Mendip, *Tucker*, sp.; material too scanty to be named more definitely.—**R. omissa* Déséglise. 1. East of East Anstey; under the type, I believe.—Var. **submollis* (Ley). 1. By the Barle, between Hawkridge and Dulverton (named by Major Wolley-Dod); leaflets hardly glandular beneath. This segregate had not, I think, been identified from Somerset.—*R. obtusifolia* Desv. 8. Milton Clevedon (confirmed by Wolley-Dod). *R. stylosa* Desv., *var. 3. Hedge at Blackmoor, West Buckland. Perhaps a new form. Allied to *R. systyla* Bast.; but differs by its more glabrous leaflets (sparsely hairy only the mid-rib, beneath), its crowded, pure white flowers, and its very short pedicels, rarely much exceeding the subglobose fruit, with few or no bristles. The styles are somewhat hispid. Major Wolley-Dod, writing from memory, away from books and herbaria, suggested var. *corymbosa* Desv. (var. *opaca* Baker); but that seems to have much more hairy foliage.

Pyrus Aria Ehrh. 9 or 10. A small, bushy tree—probably planted in a roadside hedge, Chewton Mendip, just on the boundary of these districts, *Tucker.*—*P. Malus* L., var. *mitis* Wallr. 3. West Buckland.

Saxifraga granulata L. 10. In two places in the Chew Valley, *Thompson.*

Chrysosplenium oppositifolium L. 6. Combe St. Nicholas.

Cotyledon Umbilicus L. 10. Old wall, Chewton Mendip, *Tucker.*

Sedum Telephium L. 10. Watery Combe, Chewton Mendip; but apparently an escape, *Tucker.*

Drosera rotundifolia L. 2. Weir Water; Larkbarrow, etc., *Hadden.* Halsway, near Stogumber, *Watson.*

Myriophyllum alterniflorum DC. 2. Weir Water; Oare Water, *Hadden.*

Callitriche obtusangula Le Gall. 5. Abundant in ditches on Sedgemoor, about Boroughbridge.

Peplis Portula L. By a field-pond, south of Furze Hill Plantation, Chewton Mendip, *Tucker.*

Lythrum Salicaria L. 10. Chewton Mendip, *Tucker.*

Epilobium angustifolium L. 6. Combe St. Nicholas, *Watson.*—*E. hirsutum* L. 5. A form with white flowers, but drying very pale flesh-colour, grows in a wood north of Somerton.—*E. palustre* L. 9. Mineries Bog, Chewton Mendip, *Tucker.*

Hydrocotyle vulgaris L. 2. Porlock Marsh; Horner, *Hadden.*

Carum segetum Benth. & Hook. 2. Porlock, *Hadden.*

Sison Amomum L. 10. Hedge near Litton; only a plant or two, *Tucker.*

Aegopodium Podagraria L. 10. Chewton Mendip, *Tucker*.

[*Myrrhis Odorata* Scop. 2. Opposite Lower Court Farm, Freborough, *Dr. Killick*, sp.]

Oenanthe pimpinelloides L. 3. West Buckland.

Caucalis nodosa Scop. 10. Chewton Mendip, *Tucker*.

Adoxa Moschatellina L. 2. Porlock, *Hadden*.

Viburnum Opulus L. 3. West Buckland. 10. Chewton Mendip, *Tucker*.

Galium Cruciata Scop. 10. Chewton Mendip, *Tucker*.—*G. palustre* L., var. *Witheringii* (Sm.). 2. Dunkery, *Hadden*.

Asperula odorata L. 10. Chewton Mendip, *Tucker*.

Valeriana dioica L. 10. Chewton Mendip; Litton, *Tucker*.—*V. officinalis* L. (α. *Milkanii* Syme). 5. Local in Copley Wood, near Kingweston, on the Lias.

Valerianella dentata Poll. 10. Chewton Mendip, *Tucker*, sp.

Centranthus ruber DC. 5. With white flowers on a railway-embankment north-east of Somerton. 10. Lime quarry, Chewton Mendip, *Tucker*.

Dipsacus pilosus L. 2. Porlock Weir, *Hadden*.

Filago minima Pers. 9. Near Clevedon (Portishead side), *Rev. E. Ellman*.

Gnaphalium uliginosum L. 10. Chewton Mendip, *Tucker*.

Bidens cernua L. 3. Norton Fitzwarren, *Watson*.

Achillea Ptarmica L. 10. Chewton Mendip; scarce, *Tucker*.

Anthemis Cotula L. 10. Common at Chewton Mendip, *Tucker*.—*A. nobilis* L. 2. Roadside, Horner Woods, *Hadden*.

Chrysanthemum segetum L. 2. Porlock Hill, in cornfields, *Hadden*. 10. Chewton Mendip (one plant), *Tucker*; *C. Parthenium* Bernh., he adds, is frequent there.

Matricaria suaveolens Buchenau (*discoidea* DC.). 3. Docks, and 5. East Quay, Bridgwater, *Hamlin*.

Tanacetum vulgare L. 10. Field near Willet's Lane, Chewton Mendip, *Tucker*—a large patch.

Petasites ovatus Hill. 4. Fine and abundant by the River Isle, Donyatt.

Senecio sylvaticus L.; *S. erucifolius* L. 3. West Buckland.

Carlina vulgaris L. 2. Porlock (Ley Hill, etc.), *Hadden*.

Arctium Lappa L. (*majus* Bernh.). 4. Streets Lane, Staple Fitzpaine, *Miller*. Mr. Hadden writes that at Porlock the Burdocks are called "Billy-buttons."

Carduus pycnocephalus L., var. *tenuiflorus* Curt. 3. Norton Fitzwarren, *W. Watson*. Seldom occurs inland.—*C. crispus* L. 10. Chewton Mendip, *Tucker*.—*C. crispus* × *nutans*. With the parents, on the Lias, above Hurcot, Somerton?

Cnicus eriophorus Roth. 3. By a wood near Wych Lodge, Corfe; and 4. Streets Lane, Staple Fitzpaine, *Miller*. 10. Chewton Mendip, *Tucker*.—*C. pratensis* Willd. 3, Northmoor, near Lyng; bogs on Blackdown, West Buckland. 9. Chewton Mendip, *Tucker*.—*C. arvensis* Hoffm. 10. With white flowers, for several yards along a hedgebank in Sage's Lane, Chewton Mendip, *Tucker*.

Serratula tinctoria L. 5. A very large patch in Copley Wood, near Somerton. 10. York's Lane, Chewton Mendip; also in meadows near Litton, *Tucker.*

Picris echioides L. 2. Minehead and Selworthy, *Hadden.*

Crepis taraxacifolia Thuill. 2. Plentiful at Porlock, *Hadden.* 4. Staple Fitzpaine, on the Lias. 10. Chewton Mendip, *Tucker.*

**Hieracium grandidens* Dahlst. 1. In good quantity on sunny railway-cuttings, a little east of East Anstey Station; extending into v. c. 4. N. Devon. As this grows in profusion on Sheepwash Hill, between Molland and Twitchen, only a few miles westward, it should be found under less artificial conditions in S.W. Somerset. New for the County. A well-marked species. Root-leaves dark green and glabrous above, hairy beneath; with numerous broad teeth, subobtuse, apiculate. Stem-leaf one, small, or reduced to a bract. Heads very black-glandular, epilose. Styles livid. Ligules glabrous. It comes nearest to *H. serratifrons* Almq., var. *cinderella* Ley; but that has different foliage and much greyer heads. Large examples attain a height of 30 inches.

**H. mutabile* Ley (Journ. Bot., 1909; *H. acroleucum*, var. *mutabile* Ley, *prius*). In several places by the Barle between Hawkridge and Dulverton, and on roadside banks near the latter village. Not recorded outside Wales; but I now suspect that this, rather than *H. sciaphilum*, was the Dulverton plant mentioned in Fl. Som. as "typical *vulgatum*"—from which it differs much in foliage and head-clothing.

H. cacuminatum Dahlst. 5. Sunny railway embankment, near Somerton, agreeing closely with my herbarium-plants so named. I believe that specimens found by me at Porlock Weir in 1907, and taken for *H. sciaphilum*, are the same thing. This is not described in W. R. Linton's *British Hieracia*; so a brief account of the Somerton specimens may not be out of place:—Often tall and strong (a yard or more high). Leaves all subsimilar, lanceolate, sharply toothed (upper part entire), acute, ciliate, thinly hairy above, with many white bulbous-based hairs beneath; veins conspicuous. Stem-leaves several, alternate, disposed symmetrically. Heads many, densely black-glandular and floccose, as are the peduncles, epilose. Phyllaries rather broad; outer bluntish, inner acute, with scarious edges. Ligules deep golden yellow; tips strongly ciliate. It approaches the *diaphanum*-group.

H. boreale Fr. 1. Dulverton. The type is much less plentiful in the Barle Valley than a plant with greener, softly hairy heads, and livid or livescent (not sooty) styles, which Mr. Linton agrees in referring to var. **Hervieri* Arvet-Touvet; apparently new for Somerset.

Hypochaeris glabra L. 2. Hillside above Bossington, *Hadden.*

Leontodon nudicaule Banks & Solander (*hirtum* L.). 10. Common at Chewton Mendip, *Tucker.*

Taraxacum erythrospermum Andrz. 2. Summit of Dunkery (1700 feet), *Hadden.*

Lactuca muralis Fresen. 13. Chewton Mendip, *Tucker.* I think that I saw it there in 1883.

Sonchus arvensis L., var. *glabrescens* Hall. (*laevipes* Koch). 1. On both sides of a railway bridge (v. c. 4 and 5) near East Anstey Station.

Tragopogon pratense L. 3. West Buckland. 4. Staple Fitzpaine. *Miller*. Cudworth, *Watson*. 10. Chewton Mendip, *Tucker*.—*T. minus* Miller. 3. Frequent at Cheddon Fitzpaine, *Miller*.

Campanula latifolia L. 1. In Fl. Som. Murray placed this among excluded species, having found only one specimen (which he thought to be a garden escape) by the Barle above Dulverton Station. This did not satisfy me, as it is not commonly grown in gardens, and it is wild in Glamorgan and E. Gloster. I was glad, therefore, to find it, in or near his station, last August, in good quantity and to all appearance native on the rocky banks of this stream; but it was not met with higher up. However, being in fruit at this time of year, it might easily be overlooked.—*C. rotundifolia* L. Red Hill, Chewton Mendip, *Tucker*.

Erica Tetralix L. 9. The Warren, Chewton Mendip. *Tucker*.

Primula veris × *vulgaris*. 10. Chewton Mendip, *Tucker*.

Lysimachia vulgaris L.; *L. nemorum* L. 10. Chewton Mendip, *Tucker*.

Vinca minor L. 2. By the mineral railway near Leighland, *Watson*. 10. Honeywell Lane, Chewton Mendip, *Tucker*.

Blackstonia perfoliata Huds. 6. Combe St. Nicholas, *Watson*.

Erythraea Centaurium Pers. 3. West Buckland.

Menyanthes trifoliata L. 6. Combe St. Nicholas.

Symphytum peregrinum L. 3. Stoke St. Mary; 4. Broadway and 6. near Castle Neroche, *Watson*.

Anchusa sempervirens L. 2. Monksilver, *Watson*.

Lithospermum officinale L. 3. Cannington Park; 5. Loxley Wood; and 8. near Butleigh Monument, *Hamlin*.

Echium vulgare L. 3. Top of Enmore Hill, *Hamlin*.

Solanum nigrum L. 3. Docks, Bridgwater, *Hamlin*.

[*Linaria dalmatica* Mill. has escaped from Kelway's Nurseries, Langport East, and is established by the railway.]—*L. Elatine* Mill. 2. Hurlstone Point; West Luccombe, *Hadden*.—*L. minor* Desf. 5. Dunball, *Hamlin*. 10. A weed at Chewton Mendip, *Tucker*.

Antirrhinum Orontium L. 2. Porlock; Hawkcombe; Hurlstone Point, *Hadden*.

Mimulus Langsdorffii Donn. 2. Streamsides, Bossington and West Luccombe ("spotted form"), *Hadden*. 3. Well established by the Tone, Chipstable (the same form); *M. moschatus* Douglas also occurs there.

Sibthorpia europaea L. 2. Bossington Beacon, *Hadden*. Combe Sydenham, *Watson*.

Veronica Chamaedrys L., *fl. albo*. 3. Last summer about a hundred roots were found by a roadside on the top of Cortu Hill, *Miller*. I have never met with this white-flowered form.—*V. montana* L. 3. Taunton; Pitminster, *Watson*. 10. Chewton Mendip, *Tucker*.—*V. scutellata* L. 3. Stockmoor, near Bridgwater, *Hamlin*.—*V. Anagallis-aquatica* L. (aggregate). 10. Litton Reservoir, *Tucker*.

Euphrasia Rostkoviana Hayne. 1. Between Hawkridge and Dulverton. 3. Hill-pastures, West Buckland.—*E. curta* Wettst., var. *glabrescens* Wettst. 3. Chipstable.

Bartsia Odontites Huds., var. *serotina* Reichb. 2. Stogumber, *Watson.*

Pedicularis palustris L. 1. Simonsbath, and generally on Exmoor, *Watson.*—*P. sylvatica* L. 3. Ash Priors Common; West Buckland. 9, 10. About Priddy and Chewton Mendip, *Tucker.*

Melampyrum pratense L., var. *hians.* 2. Roadwater, *Watson.*

**Rhinanthus major* Ehrh. × *minor* Ehrh. (× *Alectorolophus fallax* Sterneck in Oesterr. Bot. Zeitung, 1895, p. 299; *A. minor*, var. *fallax* Wimmer & Grabowski, Fl. Siles. II., 1, p. 213 [1829]). 8. During a field-day on July 6, near Edington Junction, where I had found *R. major* var. *platypterus* Fr. in quantity, the previous August, I observed numerous more or less intermediate plants; the season being very backward, *R. minor* was still in flower to some extent, whereas the bulk of *R. major* had only reached the bud stage. On my calling these intermediates to their attention, Messrs. Miller, Salter, Thompson and Watson all, I think, concurred as to their probable hybrid origin. The violet corolla-appendages as a rule resembled those of *R. major*; the light-green bracts also recalled this, and the seeds were broadly winged. Specimens brought home agreed very closely with Sterneck's description of his × *A. fallax* (*Monographie*, p. 122):—"Differt ab *A. majore* corollæ tubo recto, labio inferiore patente, dente labii superioris 0·1 cm. longo, bracteis viridibus—ab *A. minore* corollae tubo elongato, dente labii superioris 0·1 cm. longo, semper violaceo, corolla tota majore, caule semper nigro-striolato." This hybrid seems to be new for Britain, what was formerly named *R. minor* var. *fallax* being *R. stenophyllus* Schur; it has occurred in Alsace, Bavaria, Thuringia, Prussia, and Hungary. The percentage of sterile pollen-grains is said to be considerably higher than in either of the parents. It may be called × *R. fallax.*

Orobanche minor Sm. 2. Abundant in a clover-field at Porlock, *Hadden.*

Verbena officinalis L. 2. Horner; Porlock Weir, *Hadden.*

Origanum vulgare L. 2. Monksilver, *Watson.*

Melissa officinalis L. 10. Corner of roads near Leigh Woods, *Thompson.*

Nepeta Cataria L. 2. Greenaleigh Point, *Watson.*

Scutellaria minor Huds. 2. Horner Woods, *Hadden.*

Melittis Melissophyllum L. One patch beside a copse at Roadwater, *Dr. Killick*, sp. Hawkcombe (one plant), *Hadden.*

Marrubium vulgare L. Above Bossington, *Hadden.*

Stachys officinalis Trevisan (*Betonica officinalis*, L.). 3. Chipstable. 10. Chewton Mendip and Litton, *Tucker.*—*S. palustris* × *sylvatica* (*ambigua* Sm.). 3. Chipstable; Bradford.—*S. arvensis* L. 2. Common at Porlock, *Hadden.* 10. Chewton Mendip; scarce, *Tucker.*

Galeopsis angustifolia Ehrh. 5. Railway at Castle Field, Bridgwater, *Hamblin.*

Teucrium Scorodonia L. 10. Chewton, *Tucker.*

Scleranthus annuus L. 2. Cornfield on Porlock Hill, *Hadden.*

Chenopodium Bonus-Henricus L. 2. Eastcot Farm, Porlock, *Hadden.* 10. Bray's Batch, Chewton Mendip, *Tucker.*

Polygonum minus Huds., var. *subcontiguum* Wallich. 9. A very tiny state of this, only three or four inches in length, was sent to me from the Mineries Bog, Chewton Mendip, by *Tucker.*—*P. amphibium* L. 10. Litton Reservoir, *Tucker.*

Rumex Hydrolapathum Huds. 2. Osier-bed, Porlock Marsh, *Hadden.*

Viscum album L. 10. The Harptrees, *Tucker.*

Humulus Lupulus L. 10. Chewton Mendip, *Tucker.*

Parietaria diffusa Koch. 10. Chewton Mendip, *Tucker.*

Myrica Gale L. 4. Above Staple Fitzpaine, *Rev. F. G. Coote.*

Betula pubescens Ehrh. 1. Native between East Anstey and Brushford.

Carpinus Betulus L. 10. Chewton Plot, Chewton Mendip; probably planted, *Tucker.*

Salix aurita L.; *S. repens* L. 3. On Blackdown, above West Buckland.

Populus tremula L. 10. One tree in a hedge at Chewton Mendip; probably planted, *Tucker.*

Elodea canadensis Michaux. 10. Chewton Mendip, *Tucker.*

Neottia Nidus-avis Rich. 3. Milverton, *Miss Falcon.* 10. Chewton Mendip, *Tucker.*

Spiranthes spiralis Koch. 2. Porlock Marshes, plentiful, and on Porlock Hill, *Hadden.*

Cephalanthera grandiflora Gray. 10. Nedge Hill Wood, Chewton Mendip, *Tucker.*

Helleborine latifolia Druce (*Epipactis latifolia* All.). 1. Dulverton; hedgebanks near East Anstey, just within the county. 3. Hestercombe and Buncombe Wood, near Kingston; also at Broomfield, *Miller.*

Orchis Fuchsii Druce (*maculata* auct. angl.). 3. Halse; West Buckland. This is the common Somerset plant on calcareous soils, but also occurs on sand and clay.—*O. maculata* L. (*ericetorum* Linton). 1. Simonsbath, *Davy.* 3. Halse; West Buckland.—*O. incarnata* L. 1. Between East Anstey and Brushford; scarce. 3. Near West Buckland, in bogs on Blackdown. 6. Chard Common, *Watson.*—*O. latifolia* L. 1. Between East Anstey and Brushford. 3. Halse; West Buckland. 9. Mineries Bog, *Tucker.*

Ophrys apifera Huds. 10. Chewton Mendip; rare, *Tucker.*

Habenaria conopsea Benth. 10. Litton, *Tucker.*—*H. viridis* Br. 10. Very fine and plentiful in a pasture at Stratton-on-the-Fosse, *Miss K. Bateman.* Quite common in some of the meadows at Chewton Mendip, *Tucker.*—*H. bifolia* Br. 1. Beer Moors, near East Anstey.—*H. virescens* Druce (*chlorantha* Bab.). 10. Nedge Hill Wood, Chewton Mendip, *Tucker.*

Narcissus Pseudo-Narcissus L. 2. West Luccombe; Horner, *Hadden.*—*N. biflorus* Curt. 2. Abundant in several orchards about West Luccombe, Horner, Porlock, and Bossington, *Hadden.*

Galanthus nivalis L. 1. By the Exe between Winsford and Coppleham, *Miller.*

**Leucojum aestivum* L. 2. Wet copse on Porlock Marsh; a good way from any houses, and seemingly native, *Hadden.* Only known before as an obvious escape or garden outcast in Somerset; very interesting.

[*Asparagus officinalis* L. 2. One plant on the bank of the Horner Water, Bossington, *Hadden.*]

Polygonatum multiflorum All. 10. Woods at Litton and Chewton Mendip, *Tucker.*

Allium vineale L. 2. Porlock Marsh, *Hadden*; also a good patch of *A. Ampeloprasum* L., which was eaten down by cattle (as on Minehead Warren) before it could flower.

Ornithogalum umbellatum L. 10. Chewton Mendip; probably a garden escape, *Tucker.*

Narthecium Ossifragum Huds. Simonsbath, and Exmoor generally; also 6. near Otterford, *Watson.* 9 or 10. Chewton Mendip, *Tucker.*

Paris quadrifolia L. 10. Lilycombe, near Litton, *Tucker.*

Juncus squarrosus L. 1. Abundant about Simonsbath, *Watson.* 2. Badgworthy Valley, and generally common on Exmoor, *Hamlin.*—*J. compressus* Jacq. 6. Culmhead, north of Churchstanton, in quantity, *H. Slater*: the specimen which he sent me was too young, but he knows this species well.

Luzula sylvatica Gaud. 2. Oareford, *Hadden.*—*L. multiflora* Lej. 1. Exmoor, generally, *Watson.* 2. Porlock; Horner; Luccombe, *Hadden.* 6. Combe St. Nicholas.

Typha latifolia L. 9. Pools on the Mineries Bog, *Tucker.*

Lemna gibba L. 2. Porlock Marsh, *Hadden.*

Potamogeton polygonifolius Pourr. 1. Simonsbath and Exmoor, generally, *Watson.* 2. Dunkery; Oare; Weir Water, *Hadden.* 3. Bogs on Blackdown, above West Buckland. 6. Near Otterford, *Watson.*—*P. crispus* L.; *P. densus* L. 8. Near Edington Junction; the latter was in fine fruit on July 6.—*P. pectinatus* R., var. **diffusus* Hagström, form *laxus* Tiselius. 10. St. George's Wharf, Pill, *H. S. Thompson*; named by Mr. Arthur Bennett, and new for Somerset.

Scirpus pauciflorus Lightf. 1. Simonsbath, *Watson.*—*S. setaceus* L. 6. Near Churchstanton, *Miller*, sp.—*S. Tabernaemontani* Gmel.; *S. maritimus* L. 2. Porlock Marsh, *Hadden.*

Eriophorum vaginatum L. 1. Simonsbath, *Watson.*—*E. angustifolium* Roth. 1. Simonsbath, *Watson.* 3. Lucott Moor; Badgworthy, *Hadden.*—*E. latifolium* Hoppe. 1. A good patch on the northern edge of Beer Moors, between East Anstey and Dulverton.

Rhynchospora alba Vahl. 3. Bog on Buckland Hill. 6. Near Otterford, *Watson.*

Carex pulicaris L. 1. Simonsbath, *Davy.* 2. Dunkery, *Hadden.*—*C. echinata* Murray. 1. Simonsbath, *Davy.*—*C. leporina* L. 3. Ash Priors Common. 4. Staple Hill, at close on 1000 feet.—*C. Goodenowii* Gay, var. **melaena* Wimmer (under *vulgaris* Fr.).

1. Simonsbath, *Davy*, sp.; heads intensely black, but I have doubts about this melanism being a constant variety.—*C. pilulifera* L. 1. Simonsbath, *Davy*. 2. Abundant on dry moors near Porlock, *Hadden*.—*C. pallescens* L. 1. Simonsbath, *Davy*.—*C. panicea* L. 1. Simonsbath, *Watson*. 3. Halse.—Var. *tumidula* Laestad. 8. On the peat-moor near Shapwick, *Miller*, sp.—*C. pendula* Huds. 4. Ashill.—*C. strigosa* Huds. 10. Chew Valley above Pensford, in plenty; also in Markham Bottom, near Pill, *Thompson*, sp.—*C. binervis* L. 1. Simonsbath, *Davy*. 2. Abundant on Exmoor, near Porlock, *Hadden*. 3. West Buckland.—*C. distans* L. 8. West of Edington Junction, *Watson*!—*C. fulva* Host. 3. Bogs on Blackdown, West Buckland; also γ. *sterilis* Syme (*C. fulva* × *Oederi*, *oedocarpa*).—*C. Oederi* Retz. (type). 3. Hawkmoor, *Miller*, sp.—*C. hirta* L. 1. Simonsbath, *Davy*.—Var. *spinosa* Mortensen. 9. Charterhouse-on-Mendip, *Thompson*, sp.—*C. inflata* Huds. (*ampullacea* Good.). 1. By the Barle, Simonsbath, *Davy*.

[*Setaria viridis* Beauv. 3, 5. Docks and East Quay, Bridgwater, *Hamlin*.]

Milium effusum L. 2. Worthy; West Luccombe, *Hadden*.

Agrostis canina L. 3. West Buckland.—*A. tenuis* Sibth. (*vulgaris* With.)—the diseased state called *A. pumila* L. 9. Cart-track between Blackdown and Shipham, *Thompson*.

Sieglingia decumbens Bernh. 2. Porlock Marsh, *Hadden*.—3. On Blackdown, near West Buckland.

Molinia caerulea Moench. 2. Abundant on Exmoor around Porlock, *Hadden*.

Melica uniflora Retz. 3. West Buckland.

Poa nemoralis L. 3. West Monkton; Combe Florey; and plentiful in some shady hedges between Halse and Heathfield.—Var. **uniflora* Mert. & Koch. 3. Dry woodland, West Monkton. 10. Markham Bottom, Pill, *Thompson*, sp.—*P. compressa* L. 2. Porlock, *Hadden*.

Glyceria fluitans Br., var. **triticea* Fr. 6. Near Churchstanton, *Miller*, sp.—*G. plicata* Fr. 9. Weston-in-Gordano, *Thompson*, sp.

Festuca Myuros L. 3. Wall-tops, Cheddon Fitzpaine.—*F. bromoides* L. (*sciuroides* Roth). 2. Horner, *Hadden*. 3. West Buckland.—*F. pratensis* Huds. 5. Roadside near Somerton.—*F. elatior* L. 8. West of Edington Junction.

Bromus erectus L. 3. Halse Churchyard; perhaps introduced.

Agropyron caninum Beauv. 3. Taunton, *Watson*.

Nardus stricta L. Plentiful on the moors between East Anstey and Dulverton.

Hordeum nodosum L. (*pratense* Huds.). 5. Somerton.

Asplenium marinum Huds. 2. Culbone cliffs, *Hadden*.—*A. septentrionale*. 2. Old walls, near Porlock, *Hadden*. The exact locality had better not be mentioned.

Polystichum aculeatum Roth. 3. Hedgebanks, West Buckland, and between Venn Cross Station and Chipstable. 6. Combe St. Nicholas, *Watson*. 10. Common at Chewton Mendip, *Tucker*.

Lastrea Filix-mas Presl, var. *paleacea* T. Moore. 1. Near East Anstey. 6. Combe St. Nicholas, and about Churchstanton.—*L.*

spinulosa Presl. 9. Chewton Mendip; scarce, *Tucker.—L. aemula* Brackenridge. 2. Abundant in a combe running south-east of Hawkidge, *Hadden.*

**Phegopteris polypodioides* Fée. 1. By a streamlet near Simonsbath, *Davy*, sp. The Beech Fern was previously unknown for S. Somerset; there is only one other native station in the whole county.

Ophioglossum vulgatnm L. 1. Slope between Cow Castle and Landacre Bridge, with *Botrychium Lunaria* L., *Davy*, spp. The Moonwort was also found at 2. Tanyard Combe, Holford, *Hamlin*; and 10. between Stratton-on-the-Fosse and Holcombe, *Miss K. Bateman.*

Equisetum maximum Lam., and (I believe) *E. arvense* L., var. **nemorosum* Braun. 3. Shady roadsides on Buckland Hill.—*E. sylvaticum* L. 1. In a marsh by the Barle below Simonsbath, *Davy.*—Var. **capillare* (Hoffm.). 3. Plentiful for some distance on shady roadside banks, Buckland Hill.—*E. palustre* L. 3. West Buckland.

Lycopodium Selago L. 1. By the Barle, two miles above Simonsbath, *Davy.* 6. Near Otterford, *Watson.—L. clavatum* L. 2. Top of Horner Woods, rare; abundant on the moor, south-west of Stoke Pero, *Hadden.*

Pilularia globulifera L. 9. "A friend interested in Botany tells me she found a specimen at Winscombe, a few years ago," *Tucker in litt.* Sole does not seem to have worked in the south-western districts; and I think that his record of "Blackdown" refers to the Mendips, and not to the range south of Taunton (dis. 3), where it was placed in Fl. Som.

Nitella opaca Agardh. 2. Abundant in some fish-ponds, Pond Wood, Monksilver, *Watson*, sp. This is surprisingly uncommon in Somerset.

NORFOLK PLANTS.

By W. G. Clarke.

Since the publication of Mr. W. A. Nicholson's *Flora of Norfolk* in 1914, I have been able to add fifteen casuals to the county list, and also a number of new localities for rare or local species. These are as follows:—the figures denote the botanical divisions—1, East; 2, North Central; 3, South Central; 4, West.

Thalictrum minus L. 4. Cranwick, Weeting. *Ranunculus fluitans* Lam. 4. Colveston. *Aquilegia vulgaris* L. 2. Whinburgh.

Papaver Argemone L. 1. Alburgh; 2. East Beckham, Stody, West Bradenham.

Arabis glabra Bernh. 2. Bodham, West Bradenham; 3. Holme Hall. *Lepidium latifolium* L. 1. Thorpe St. Andrew. *L. heterophyllum* Benth. v. *canescens.* 1. Dilham; 2. East Dereham, Felthorpe, Yaxham; 3. Kimberley.

Saponaria Vaccaria L. 3. Keswick.

Hypericum hirsutum L. 1. Alburgh; 3. Hethel.

Geranium pratense L. 1. Swanton Abbott.

Medicago falcata L. 2. Ringland, Swannington; 4. Northwold, Weeting. *M. arabica* Huds. 1. Surlingham. *Melilotus officinalis* Desv. 4. Cranwich. *Trifolium ochroleucon* Huds. 1. Alburgh; 3. East Carleton, Flordon, Hethel. *T. glomeratum* L. 2. Hellesdon.

Rosa tomentosa Sm. 3. Fowlmere, Hethel.

Tillæa muscosa L. 2. Litcham. *Sedum reflexum* L. v. *albescens* (all the Norfolk plants belong to this variety). 2. Costessey, Sparham. *S. rupestre* L. 1. Cottishall, Southrepps.

Peucedanum palustre Moench. 1. Horsey, Potter Heigham.

Valerianella dentata Poll., v. *mixta* (Dufr.). 4. Weeting.

Matricaria suaveolens Buchenau. 1. Ludham, Potter Heigham, Ridlington, Strumpshaw, Surlingham, Wortwell; 3. Flordon. *Artemisia Absinthium* L. 3. Earlham. *A. campestris* L. 4. Northwold. *Centaurea Cyanus* L. 2. Cressenhall. *Hieracium sabaudum* L., v. *boreale* (Fr.). 1. North Walsham. *H. umbellatum* L. 1. Swafield; 2¦Costessey, Felthorpe, Whinburgh. *Hypochaeris glabra* L. 3. Ringmere.

Verbascum pulverulentum Vill. 1. Whitlingham; 2. Bowthorpe, Easton; 3. Keswick. *V. nigrum* L. × *pulverulentum*. 2. Bowthorpe. *Linaria minor* Desf. 2. Corpusty, Little Barningham; 4. Cranwich.

Mentha rotundifolia Huds. 1. Ridlington. *M. alopecuroides* Hull. 4. Mundford.

Rumex maritimus L. 1. East Ruston.

Daphne Mezereum L. 3. Hethel.

Malaxis paludosa Sw. 1. Felmingham, August 1915. *Neottia Nidus-avis* Rich. 3. Hethel. *Goodyera repens* Br. 1. Westwick, August 1915, several hundred plants. *Habenaria viridis* Br. 3. Hethel.

Scirpus pauciflorus Lightf. 1. Stalham. *S. fluitans* L. 2. Boston, Briston. *S. filiformis* Savi. 1. Felmingham.

Rynchospora alba Vahl. 1. Felmingham. *Carex paradoxa* Willd. 1. Great Plumstead, Woodbastwick. *C. sylvatica* Huds. 2. Horningtoft; 3. East Carleton.

Setaria glauca Beauv. 1. East Ruston. *Calamagrostis epigeios* Roth. 2. Horningtoft. *C. canescens* Druce. 1. Woodbastwick; 4. Ickburgh, Weeting. *Avena fatua* L. 1. East Ruston. *Melica nutans* L. 3. Rockland All Saints.

Botrychium Lunaria Sw. 2. Ringland.

Of the fifteen casuals, thirteen were found in the summer of 1915 in an area of about 1500 square yards in the heart of the city of Norwich in Division 1. Dust from English and Californian barleys was thrown here at the end of 1914–15 malting season, while in previous years it had been the repository for dust from Russian, Austrian, and Tunisian barleys. The species found on this site were *Neslia paniculata* Desv., *Rapistrum rugosum* All., *Trigonella Fœnum-græcum*, L., *Astragalus ramosus*, *Vicia monanthos* Desv., *Caucalis latifolia* L., *Anthemis mixta* L., *Anacyclus valentinus* DC., *Chrysanthemum coronarium* L., *Phleum Michelii* All., *Hor-*

deum hexastichum L., *H. leporinus* L. An unidentified *Vicia*, which resembles *V. peregrina* in some respects and *V. angustifolia* in others, though carefully compared with all the material in the Kew Herbarium by Dr. Augustine Henry and Dr. Stapf, could not be matched. The two other species not hitherto recorded for the county were *Lepidium virginicum* L. found at East Ruston in 1915, and *Ambrosia trifida* L. found at North Walsham the same year. Both localities are in Division 1.

Of the 11 species found in the Norwich area previously mentioned, the most noteworthy were *Adonis annua* L., *Delphinium Ajacis* L., *Papaver somniferum* L., *Glaucium flavum* Crantz, *G. phœniceum* Crantz (the only previous record for the county was in 1755), *Saponaria Vaccaria* (two previous records), *Medicago denticulata* v. *apiculata* Willd., *Melilotus indica* All. (two previous records), *Vicia lutea* L. (one previous record), *Lathyrus Aphaca* (no recent records), *Bupleurum rotundifolium* L., *Caucalis daucoides* L., *Galium tricome* Stokes, *Asperula arvensis* L. (one previous record), *Matricaria suaveolens* Buchenau, *Datura Stramonium* L., *Hyoscyamus niger* L., *Phalaris canariensis* L., *Milium effusum* L., *Apera spica-venti* Beauv., *Bromus tectorum* L.. *Lolium temulentum* L., and *Hordeum marinum* Huds.

In Suffolk, Mr. W. H. Burrell, F.L.S., and I found *Veronica triphyllos* L. and *V. verna* L. at Icklingham in May 1913; in May 1916 I found *Carex ericetorum* Poll. at two stations, three miles apart, in Eriswell.

ALFRED GRUGEON.

(1826–1913.)

Alfred Grugeon was born at Spitalfields, July 27th, 1826 and died at Walthamstow, February 14th, 1913. As his name suggests, he was of Huguenot descent, his father still practising the craft of silk-weaving. According to Grugeon's own account he knew and could distinguish at the age of three the different crops grown in his father's garden, and he continued to take an interest in plants though he had no botanical training. He attended some botany classes in 1849 in Bunhill Row: the students were four in number and they collected plants on Sunday, naming them with the help of the teacher and Macreight's *Manual* on the Monday evening. The enthusiasm of Grugeon and a fellow student apparently proved too much for their teacher and he resigned, and no one could be got to take his place. At this time Grugeon began to buy botanical books and was able to make some progress in a somewhat desultory way until 1860, when, hearing that M. C. Cooke was giving botany lessons at the Working Men's College he joined that institution. Shortly afterwards he sat for the South Kensington examination in botany and gained a prize. The following session Cooke resigned, and as no other teacher could be obtained Grugeon was persuaded to carry on the class and with Cooke's help soon passed the examinations necessary to become a certificated teacher in botany. He taught various odd classes, but continued with the botany classes at the Working Men's College from 1862 to 1868 when he left London. On his return in 1879 he became Curator of the Museum, and later resumed the teaching of botany: his teaching at the College lasted over thirty years.

Grugeon was one of the original members of the Society of Amateur Botanists, which Cooke formed from amongst his old students. According to Grugeon, some of those who joined the Society became jealous of Cooke's position, and he transferred his energies later to the new Quekett Club.

Grugeon accompanied Cooke on a week's tour in North Wales in 1865, but found to his surprise that the main idea was that Cooke's expenses should be covered by collecting microfungi for fascicles. He explains Cooke's interest in fungi by the fact that he found an old set of continental microfungi in a lot which was knocked down to him at a sale of herbaria; Cooke carefully examined these, but their condition was such that nothing could be identified except the leaves of the host. Although Grugeon was friendly with Cooke and freely admitted that he owed him much, he did not pretend that the mycologist was in all respects everything that could be desired.

Grugeon was a wood turner by trade, and his skill with the lathe enabled him to construct some very ingenious models for his botanical classes. He also invented a special "chuck" used largely since for turning "spirals" in hard woods: this was shown at the Great Exhibition, 1851, and earned a bronze medal and certificate.

In many ways Grugeon recalled the best type of north country naturalist. He was of kindly nature, cheery humour and clear and independent in his views. He was intimately connected with the Working Men's College, and he was for years one of the mainstays of its social life; he was president of its "Lubbock Field Club" from its foundation in 1893 until his death. He contributed several papers on botany and natural history to the college magazine, provided Trimen and Dyer with some notes for their *Flora of Middlesex*, and wrote a small primer in Murby's Science and Art Series on *Botany: Structural and Physiological*, 1873, which was much used in elementary classes. But his work for Botany cannot be judged from what he published: in his long teaching career he must have introduced large numbers of working men to a subject of which, but for him, they had remained totally ignorant. That his work was duly appreciated is shown by the fact that his friends subscribed £30 as a memorial to him, the yearly income from which is devoted to the purchase of botany books for the library; and the botany class room in the Working Men's College is now called the Grugeon Laboratory.

For most of the above facts I am indebted to an unpublished MS. "Botanical Reminiscences," a paper read before the Lubbock Field Club by Grugeon in 1896, and *The Working Men's College Journal* for 1913—both kindly lent by Mr. C. E. Britton, who has himself supplied information.

J. Ramsbottom.

SHORT NOTES.

TOLYPELLA INTRICATA Leonh. On May 25th (1917) I found this plant growing in an old disused strontium digging in the neighbourhood of Yate, W. Glos. A specimen was submitted to Mr. James Groves, who says that *Tolypella intricata* was first recorded for W. Glos. by St. Brody in the Newent Canal.—CECIL SANDWITH.

CAREX PSEUDO-PARADOXA S. Gibs. (p. 139). From his letter to me I anticipated Mr. Salmon's suggestion that this plant might possibly be the inferior specimen of *C. paniculata* alluded to by me as growing with *C. teretiuscula* at Seaman's Moss Pits; and for this reason I was wishful to see Hunt's herbarium, where I know some specimens of *C. paniculata* from this locality were preserved (Fl. Cheshire, p. 322). I have been unsuccessful in discovering Hunt's herbarium, but Mr. Charles Bailey found, in his collection, specimens of *C. paniculata* gathered at Seaman's Moss by Mr. John Hardy in 1852—only eight years after the controversy; these Mr. Salmon has seen and determines to be *C. paniculata*—they confirm my recollection in being inferior to those frequently found in Cheshire meres. If *C. pseudo-varadoxa* grew, as Gibson says, plentifully by the sides of Malham Tarn and was also found at Seaman's Moss Pits, it appears strange that no specimen seems to be in existence from either locality. It might even now be desirable to search for it at Malham, but Seaman's Moss Pits were filled up and the locality destroyed many years ago.—SPENCER H. BICKHAM.

CHÆNOTHECA MELANOPHÆA (Ach.) Zwackh., var. nov. FLAVOCITRINA. The lichen for which the above name is proposed, was recently collected in a wood near St. Alban's. Herts. Its characters are microscopic, but the deep yellow colour of parts of the thallus makes it quite easy to detect after once being seen. It may be diagnosed as: "Thallus granulatus, effusus, subcrassus, primum endophlæodes, colore variabilis e cinereo flavescens. Apothecia numerosa iis plantæ typicæ similia." The whole colouring suggests the variety *ferruginea*, but the apothecia are not sessile and there is a difference of habitat.

This variety occurs in great abundance on the bark of oak and ash—the latter scarce in the wood—and also on the still adhering stems of dead ivy. The oak and ash trees are not of great age; the stems of ivy, on which the lichen was found, averaged 4 mm. in diameter. In the case of the ivy, the greater part of the lichen thallus is immediately under the epidermis, which extends over it as a bright yellow film. After a time the epidermis breaks up and the granular thallus is then seen to spread over the outer surface and to be freely exposed, but before this takes place some of the apothecia break through and appear to be growing from the yellow film. On the oak the thallus sometimes creeps under the edge of the old phellogen layers of the bark, and here also the apothecia occasionally force themselves through, before the overlying phellogen has been broken into fragments by the pressure of the growing lichen from beneath.

The reaction of the thallus with potassium hydrate is, as in the species, a purplish red colour due to the presence of salazinic acid (Lettau in *Hedwigia*, lv. 25, 1914). On applying the reagent to the lichen, before the relation to the substratum is disturbed, a rapidly developed purplish red colour becomes evident; but if a small portion of the thallus on the under side of the epidermis of the ivy is scraped off neither the hyphæ nor the algal cells show the deep stain; they are practically not changed at all. It is the periderm cells, through which the hyphæ have ramified, that become so markedly coloured and show so readily through the thallus above. The same may be said of the dead phellogen layers of the oak bark, it is the contents of these cells that exhibit the dark purple reaction with potassium hydrate. As to the thickish granular thallus, so abundantly developed on the exposed surface of the outer bark, the hyphæ do not stain with the reagent and many of the algal cells are unaffected, but in some, where the green colouring matter has become yellow or colourless, the contents show a pink reaction tinge. The algal cells are the normal Protococcus green shells which are sometimes stained yellow. The hyphæ are remarkably wide, being from 2 to 3 in. in diameter.—ROBERT PAULSON.

REVIEWS.

Science and the Nation: Essays by Cambridge Graduates with an Introduction by the Right Hon. LORD MOULTON, K.C.B., F.R.S. Edited by A. C. SEWARD, F.R.S., Master of Downing College. Cambridge University Press, 1917. Pp. xxii+328. Price 5*s*. net.

LORD MOULTON prefaces this valuable volume of essays with a weighty indictment of our national notion of education. "It has been fashionable," he says, "for the well-to-do to choose for their children an education devoid of Science and indeed devoid of continuous intellectual effort . . . . it was considered no shame that a man should leave his University not only ignorant of Modern Languages and Science but also unprovided with any economical or commercial training that could be of value to him in practical life. This example has been followed by other classes of the community who have naturally accepted the standards of education adopted by the wealthier classes as being the best, and thus much of the best human material that England produces has been set to its work in life without any special preparation for the task before it." As Sir Arthur Evans put the matter in his address to the British Association at Newcastle, English opinion is not so much indifferent as actually hostile to education; and the thirteen Cambridge Professors whose essays are here marshalled by Professor Seward have set out to demonstrate to a nation of philistines the practical value of pure science. It is, perhaps, appropriate that such a volume should appear under the ægis of the representative of so purely scientific a study as palæo-botany; but, whether the writer be chemist, metallurgist, mathematician, forester, geologist, agriculturist or physician, the main thesis is the same throughout, viz. that much of the supposed distinction between pure and applied or technical science is fallacious. Thus the Sadleirian Professor of Pure Mathematics shows (p. 92) how Lagrange's abstract conception of generalized co-ordinates led to the invention of wireless telegraphy; and the Superintendent of the Metallurgy Department of the National Physical Laboratory traces the whole of the accurate knowledge of metals with which he is himself personally concerned to the application of the microscope to the study by the geologist Sorby in 1861. Heavy financial losses have forced upon our landowners the recognition of the importance of the work of the forest entomologist and the forest mycologist; and Professor Biffen's wheat-breeding is only one—though, perhaps, that which most comes "home to men's business and bosoms"—of the applications of the purely scientific experiments of Mendel. We have never read any "romance of science" so fascinating as the story told by Professors Hopkins and Nuttall of the gradual application of the work of Pasteur by Lister, Metchnikoff, Ehrlich, Manson, Ross and their fellow-workers of to-day to that mastery of one disease after another which has transformed modern medicine from a mere congeries of empiricism into an inductive science. We fully agree with Dr. Keeble when, after discussing the work of Dr. Russell on soil-sterilization and that of Johannsen on etherising plants, he sums up (p. 127):—

"If only from the point of view of a good national investment, pure science should receive large encouragement and support from the State. Nor should the encouragement be financial only. A wider source of recruiting must be open to pure science whereby some of the highest ability shall find its way into the ranks of scientific workers and not so exclusively as now to the Temple and India, and parts of Whitehall, Westminster and the City."

There is necessarily a little overlapping and repetition in the treatment of the related topics by various pens; but the multiplicity of interesting subjects touched upon as illustrating the main thesis makes the book at least worthy of an index, which, alas! it has not.

G. S. Boulger.

Tree Wounds and Diseases, their Prevention and Treatment; with a special chapter on fruit trees. By A. D. Webster. With 32 plates. Williams & Norgate. Price 7*s.* 6*d.* net.

It has been gratifying to read of the skilful manner in which our French allies have defeated the dastardly German mutilation of their fruit trees; but Mr. Webster is fully justified in the statement in his Introduction that in this country "the work of tree repair is but rarely engaged in and little understood." It may, perhaps, be true that "no book dealing exclusively with tree wounds *and* diseases has been written," although there are various works, both English and foreign, in which one class or other, of tree diseases are better treated than they are in the present volume, and we are not sure that an article on 'Practical Tree Surgery,' by J. Franklin Collins, in the Year-book of the United States Department of Agriculture for 1913, does not deal more satisfactorily with the other half of his subject than does Mr. Webster.

It is clear that the writer has a good practical experience in the subject on which he writes; and there are, perhaps, no very serious reasons against the adjustable iron band which he prefers to the simpler and cheaper method of supporting heavy branches by boring a hole through them for a supporting rod; but there is, we think, a more important fundamental unsoundness of principle running through the book. Mistakes of mere carelessness are far too numerous. In describing the annual rings (p. 8), no doubt "concentric" was meant where "consecutive" has been written. It is hardly correct to say, as on p. 9, that the cambium-layer "transmits the sap from the roots to the crown." If it is only by slip-shod writing that the Ash-tree and not *Nectria* is termed "strictly parasitical" (p. 9); that an "early spring succeeded by a frosty winter" is spoken of (p. 101); that *Rhytisma punctata* is styled "this insect" (p. 107); that mosses and lichens are both called "parasites" (p. 110)—we are sure that other mis-statements are not the result of ignorance. Mr. Webster no more believes the larvæ of moths to be deposited on the bark (p. 119), or a caterpillar to deposit her eggs (p. 162), than he means to state, as he does on p. 151, that rabbits roost on trees. As the excellent plates are unnumbered, the references to "the accompanying illustration," often some pages away, are not illuminating. These blemishes are, however, small matters that can easily be remedied when the book reaches the new edition which its practical value deserves. What is, we think, more serious is Mr. Webster's attitude towards fungoid disease. On p. 93, and elsewhere, he speaks of decay as of something quite independent of, and only to be accelerated by, such disease; on p. 95, he recommends "removing the fungus," by which he clearly means the pileus, "cleaning away all dead and dying matter, and coating with tar," apparently oblivious of the almost certainly pervading presence of mycelium of which the "fungus" is only a surface indication. We are afraid that, in many cases, as when cavities are to be filled with cement, such superficial treatment of the cause of decay may spell failure.

G. S. Boulger.

BOOK-NOTES, NEWS, ETC.

We regret to learn that it has been decided by the Government to suspend the circulation of the *Bulletin of Miscellaneous Information* issued in connection with the Royal Gardens, Kew, on the ground that its publication is not essential. A communicated article in the *Times* for May 29 protests against this action, pointing out that when, in 1892, on the score of expense, it was proposed that similar action should be taken, "it was saved by the powerful influence" of that paper. This, by the way, may or may not have been the case: the reason given by Mr. Plunket, then First Commissioner of Works, was that it was "highly valued by many persons" (see Journ. Bot. 1892, 191). At that time the irregularity of its issue was notorious, and it was difficult to justify the statement of the *Times* that its publication was "one of the most useful functions discharged by" Kew. Under the present Directorate of the Gardens, however, the *Bulletin* has attained a position of importance, botanical as well as economical—indeed we are not sure that those who have decided on its suppression may not have been influenced by the prominence given to matter of scientific rather than economic value. There is some satisfaction in finding that even the *Times* cannot control everything, but the protests that have been made independently of that paper might, we think, have been allowed to prevail, especially when the lavish—some would say extravagant—expenditure in other directions is taken into account. As the *Times* points out, "the net cost of the *Bulletin* is more than counterbalanced by the enrichment of the library at Kew by publications received from all quarters in exchange for copies of the *Bulletin.* In enemy countries the starvation of intellectual activities is not accounted to be any part even of war economy. The German publications corresponding to the *Kew Bulletin* continue regularly to appear and even to receive reports from colonies which are no longer German."

The matter, however, has been finally decided, and on June 11 Mr. Stanley Baldwin, Lord of the Treasury, announced that "the Controller's decision was acquiesced in by the Director of Kew Gardens," and that "the Editor had been consulted before any action was taken." Asked whether the Director's acquiescence implied approval, Mr. Baldwin stated that he "was not qualified to answer the question." It is thus too late to offer any suggestion, or one would have been inclined to ask whether by raising the price of the *Bulletin,* which has always been purely nominal, something might not have been done to meet the difficulty. It is understood that the fee now charged for entering the Royal Gardens was imposed on the ground that otherwise it would have been necessary to close them; and a similar course might perhaps have been adopted with regard to the *Bulletin*: or it might have been possible to issue it less frequently, and temporarily to restrict the contents to subjects of economic importance. Anything would have been better than stopping it altogether, and we regret exceedingly that such a course has been decided upon.

At the Annual Meeting of the Linnean Society on June 7, the first Hooker lecture was delivered by Prof. F. O. Bower, F.R.S., who chose for his subject "The Natural Classification of Plants," illustrating his points by reference to the Filicales. The Hooker lecture arose from a bequest of the late Sir Joseph Hooker, augmented by subscriptions from the Fellows of the Society and a further contribution by Lady Hooker.

Messrs. Routledge send us "an entirely new edition" of Johnson's *Gardeners' Dictionary and Cultural Instructor*, which, based on the original edition of 1846, has been recast and brought down to the present year by Messrs. J. Fraser and A. Hemsley, whose many years' connection with Kew is sufficient guarantee of their competence for the task. It would be an interesting task to compare the present with the original of seventy years ago, and we hope this will be done in one of our horticultural journals. Here we must content ourselves by expressing our appreciation of the amount of information contained in the work—a handsome volume in demy octavo, containing more than 900 pages in double columns, printed in small but very clear type: information which, so far as we have been able to test it, is both full and accurate. The editor's preface shows that the best authorities have been consulted, and that every care has been taken to make the book what it claims to be—"an indispensable work for the serious gardener." The lists of species (alphabetically arranged) under each genus are very complete, the colour of the flowers being indicated for each and the date of introduction when known: translation of each name is given, and consultation is rendered easy by numerous cross-references: the derivation of the names of the genera is supplied, and the family to which each belongs is indicated: the Linnean classification is also given—a relic of the original issue which might, we think, have been dispensed with. Full cultural directions are given, as well as descriptions of the more common plant diseases, insect and other enemies, with methods of prevention and remedy. The volume would at any time be cheap at 12*s.* net: its production at that price at the present time is little short of marvellous.

The *Irish Naturalist* for May contains a paper by Mr. David McArdle on the Musci and Hepaticæ of the Glen of the Downs, co. Wicklow; eleven of the former and six of the latter are new to the county.

William Foggitt was born at Yarm, a small market town on the Yorkshire side of the Tees midway between Darlington and Stockton, on Feb. 2, 1835. When he was about a year old his father removed to Thirsk and started business as a chemist and druggist in the market place. The son began his education at home and finished it at a private boarding school at Tadcaster. Whilst quite young Johns's *Flowers of the Field* came into his hands and he began to collect and press plants. He entered his father's business and in due time became a partner and started on his own account a wholesale department. About 1850 there were half a dozen young men at Thirsk interested in natural history, who formed themselves into a small society to explore the neighbourhood. Foggitt became a life member of the London Botanical Society, which his friend Mr. J. G. Baker had already joined. When that society came to an end they undertook to carry on its distribution of specimens, Mr. Baker acting as honorary distributor. The Botanical Exchange Club thus started has been in existence more than fifty years. When Mr. Baker's house with all his collections and books were destroyed by fire in May 1864, happily after the distribution for the year had been made, Foggitt very liberally gave his large stock of duplicates to replace the loss. Foggitt, who was a devoted member of the Wesleyan community, married early and had a large family: two of his sons with similar tastes to his own joined him in his business; the elder —Mr. J. T. Foggitt—has a very fine living collection of alpine plants. Foggitt did not write much on Botany, but had an excellent knowledge of the plants of N.E. Yorkshire and was always in great request as a judge at local flower shows. He contributed the chapters on Botany to Bogg's *Vale of Mowbray*, and in 1903 became a Fellow of the Linnean Society. He died on May 10 and was buried in the Thirsk cemetery.—J. G. B.

TROPICAL AFRICAN URTICACEÆ.

By Dr. A. B. Rendle, F.R.S.

The following new varieties and species have been met with in the course of elaborating the family for the *Flora of Tropical Africa*. A number of species of the genus *Urera* have been already described in this Journal (1916, p. 368).

Fleurya urticoides Engl. var. glabrata, var. nov. Planta pilis urentibus deflexis munita sed a specie differt indumento hispidulo nisi in inflorescentia deficiente.

Hab. Mt. Kilimanjaro; Marangu at 8700 ft. *Volkens*, 980! Herb. Mus. Brit.

Apparently a geographical form; the species occurs in the Cameroons.

Pilea tetraphylla Bl. var. major, var. nov. *Herba* habitu speciei similis sed omnino major. *Caules* e basi profuse radicante usque ad 4 dm. alti et 3 mm. crassi, internodiis 6–13 cm. long., ramis elongatis suberectis. *Folia* in caule robusto 4·5–6 cm. long., 2·5–5 cm. lat., in ramis et caulibus debilibus minora. *Inflorescentiæ* 2·5–3 cm. long.

Hab. Cameroons; Buea at 7000 ft., *Preuss*, 1001! Herb. Mus. Brit.; Herb. Kew.

Elatostemma Welwitschii Engl. var. cameroonense, var. nov. *Herba* quam in specie major *foliis* majoribus sessilibus vel interdum breviter petiolatis, usque ad 12 vel 15 cm. long. et 4·5–6 cm. lat.; nervis 2 lateralibus basalibus sæpius ultra laminae medium extensis, eo in latere angustiore supra basin ineunte.

Hab. Cameroons; Johann-Albrechtshöhe, *Staudt*, 839! West of Buea, *Preuss*, 607! Fernando Po; Clarence Peak, at 4000 ft., *Mann*, 632! Herb. Kew.; Herb. Mus. Brit.

The Cameroons specimens were originally distributed as a distinct species, *E. kamerunense* Engl., but Engler subsequently referred them to his *E. Welwitschii* (see Engl. Bot. Jahrb. xxxiii. 125).

Boehmeria platyphylla Don var. angolensis, var. nov. *Frutex* pyramidalis usque ad 8 pedes altus, in partibus juvenilibus pubescens. *Folia* flaccida, elliptica sed basi cuneata, apice acuta vel breviter acuminata, margine supra basin æquabiliter dentato-serrata, 15–22 cm. long., 7·5–10 cm. lat. *Perianthum* fructu compressum, rotundum vel obovoideum cum collo brevi, supra basin hirtellum.

Hab. Angola; Granja de S. Luiz, Cazengo, *Gossweiler*, 4656! 4851! Herb. Mus. Brit.

Var. ugandensis, var. nov. *Frutex* dispersus, 4–8-pedalis, hirsutus. *Folia* in sicco rigida, elliptico-lanceolata vel elliptica, rarius ovata, apice acuminata, basi rotundata, margine supra basin æquabiliter serrato-dentata, 10–19 cm. long., 4–6 cm. rare 9 cm. lat., in facie superiore rugulosa et scabrida, in facie inferiore, præcipue in nervis, hirsuta, prominenter 3-nervia. *Spicæ* simplices, folia excedentes. *Perianthium* fructu compressum, breviter obovoideum vel rotundatum, collo brevi, superne hispidulum.

Hab. Uganda; *Scott Elliot*, 7531! Entebbe, *Bagshawe*, 799! Mawokota at 3900 ft., *Brown*, 204! Ankole at 5000 ft., *Dawe*, 423! Kirerema at 4000 ft., *Dümmer*, 89! Kipayo at 4000 ft., *Dümmer*, 979! Monbuttu; River Kussumbo, *Schweinfurth*, 3204! Herb. Mus. Brit.; Herb. Kew.

Pouzolzia Batesii, sp. nov. Planta monoica 3–5-pedalis, caulibus juvenilibus puberulis, demum inferne lignosis, ramis tenuibus, ascendentibus, superne foliatis. *Folia* alterna, longe petiolata, ovata, valde acuminata, basi rotundata vel obtusa, margine integra, 3-nervia, in facie superiore sparse pilosa et cystolithis punctulata, inferne in venis prominulis breviter et sparsius pilosa; petiolus tenuis. *Stipulæ* glumaceæ, ovatæ, acuminato-caudatæ, margine sparse et longe ciliatæ. *Flores* sessiles ad nodos glomeratæ, glumeruli dense multiflori, androgyni, bracteis parvis. *Perianthium* floris masculi alte 4-partitum, segmentis apiculatis, glabrescentibus; floris fœmineæ superne constrictum, glabrum, quam stigmate anguste lineari brevius; *fructu* ovoideo-acutum, nervis longitudinalibus inconspicuis. *Achænium* politum demum atrate brunneum.

Hab. Cameroons; Batanga, *Bates*, 214! Efulen, *Bates*, 221! Ngoko, *Schlechter*, 12729! Belgian Congo; Mongala, Mombongo, *Thonner*, 153! Herb. Mus. Brit.; Herb. Kew.

Stems reddish brown and woody below with a thin separable bark. Leaves 2·5–9 cm. long, ·8–3·5 cm. wide, apex to 2 cm. long, the basal lateral nerves curving upwards above the middle with 2 to 3 lateral nerves above on either side of the midrib; petiole to 6 cm. long. Stipules 4–6 mm. long. Fruiting perianth about 1·5 mm. long.

P. guineensis Engl. in Schlechter Westafr. Kautsch.-Exped. 287 non Benth.

This species has been confused with *P. guineensis* from which it is distinguished by the narrower, glabrous, flask-shaped fruiting perianth without conspicuous longitudinal veins; also by the very long-stalked leaves of the main stem.

Pouzolzia shirensis, sp. nov. *Frutex* monoicus ramis cortice tenui rubello indutis, ramulis foliatis, tenuibus, hirtellis. *Folia* membranacea, breviter petiolata, ovata vel lanceolata, acuta, basi obtusa, margine integra, ciliolata, 3-nervia, in facie superiore scabridula, inferne venis tenuibus prominulis et sparsius pubescentia vel primo albido-tomentosa; petiolus tenuis, pubescens. *Stipulæ* brunneæ, glumaceæ, late lanceolatæ, acuminatæ, persistentes. *Flores* ad ramulorum nodos glomeratæ, glomeruli petiolis breviores androgyni. *Perianthum* floris masculi breviter pedicellatum, campanulatum, ad medium 4- vel 5- fidum, segmentis ovatis, acutis, dorso puberulis. *Stigma* longum, tenue. *Perianthium* fructu immaturo late ovoideum, superne constrictum, puberulum, nervis longitudinalibus inconspicuis, achænium, leve, albidum arcte includens.

Hab. Shire Highlands; *Scott Elliot*, 8679! Herb. Mus. Brit.; Herb. Kew.

Branches in specimen 2–4 mm. thick, bearing numerous spreading leafy shoots 12 cm. or less in length with internodes 8–12 mm. long and bearing leaves and inflorescences at the nodes. Leaves 4–5·5 cm. long, 1·5–2·5 cm. wide, the lateral pair of basal nerves ascending well into the upper half of the leaf and with 2 or 3 upper lateral nerves on each side; petiole 4–8 mm. long. Stipules 3–4 mm. long, shortly hairy on the back of the midvein. Flower-clusters consisting of numerous male and a few female flowers. Male perianth and unripe fruiting perianth about 1·5 mm. long.

Near *P. abyssinicum* Bl., but a much more robust plant.

Droguetia debilis, sp. nov. Planta parva, debilis, caulibus tenuibus rigidulis inferne prostratis et radicantibus, tum ascendentibus, ramis paucis debilibus, superne sparse hispidulis, inferne glabratis. *Folia* alterna, membranacea, ovata, acuta, basi obtusa, margine basi integra excepta crenato-serrata, 3-nervia, utrinque viridia at subtus pallidiora, in facie superiore cystolithis punctulata et sparse hispida, infra in nervis tenuibus hispida: petiolus filiformis, hispidulus. *Stipulæ* scariosæ, ovato-acuminatæ. *Inflorescentiæ* axillares; involucra androgyna gemina lateralia ventricosa, margine superiore denticulata, flores 3 masculos et 2 fœmineos includentia, in medio exstant quoque 2 dichasia fœminea; involucrum fœmineum 1-florum. *Flos masculus* breviter pedicellatus, perianthii lobus medianus breviter acutus. *Achænium* compressum late ovoideum, obtusum, atratum.

Hab. Ruwenzori; Mau, 7–8000 ft., *Scott Elliot*, 6799! Herb. Mus. Brit.; Herb. Kew.

A weak plant with slender wiry stems, 1 mm. or less thick and 10–15 cm. long with a few short weak ascending branches. Leaves 2–2·5 cm. long, 1–1·5 cm. wide; petiole half the length of the blade or less. Stipules about 2 mm. long, white with a green hispidulous midvein. Inflorescence 2·5 mm. long consisting of a pair of androgynous involucres one above each stipule, and a young female 2-flowered dischasium on either side at the base of the undeveloped axillary shoot. Achene 1·3 mm. long. Differs markedly from the nearest allied species *D. umbricola* Engl. in the habit and characters of inflorescence.

Forskohlea Eenii, sp. nov. *Suffrutex* (ut apparet) ramis tenuibus hispidulis. *Folia* petiolata, e basi cuneata ovata, vel interdum subrhomboidea, apice subacuta, basi in petiolum decurrentia, margine supra basin integram grosse et obtuse serrata, penninervia, in facie superiore viridia, scabrida, in facie inferiore inter venas conspicuas albido-tomentosa. *Stipulæ* scariosæ, late ovatæ, breviter acuminatæ. *Capitula* in axillis sæpe geminata, sessilia, involucrum campanuliforme, sæpius 4-foliolatum, foliolis suberectis, oblanceolatis, breviter acutis, in parte inferiore dense sericeis (pilis sæpe viridescentibus), in parte superiore dorso et margine hispidulis.

Hab. Damara Land; *T. G. Een*! Herb. Mus. Brit.

Described from two slender leafy twigs 15–20 cm. long and scarcely exceeding 1 mm. in thickness. Leaves 2·5 cm. long or less, 7–12 mm. wide; petiole up to 7 mm. long. Stipules about 3 mm. long. Flower-heads 7–8 mm. long.

A well-marked little plant, characterized by its slender twigs, small leaves, bright green when dry, and bell-shaped flower-heads with erect bluntly pointed bracts. *F. hereroensis* Schinz, also from Damaraland, is a much coarser plant with larger involucres the bracts of which are sharply acute.

NEW RARE OR CRITICAL LICHENS.

By W. Watson, B.Sc.

(Continued from p. 111.)

Evernia furfuracea form *scobicina* (Ach.) Nyl. On siliceous wall, Bwlch Gwyn (50). Form *ceratea* (Ach.) Nyl. On old wall, Thwaite (65). Both these forms are often confluent with the type and intermediates.

Parmelia perlata auct. plur. Hue, in his *Causerie sur les Parmelia*, uses names for this plant and its segregates which are not usually followed by British lichenologists. His work is chiefly based on the *P. perlata* of Acharius, but *Lichen perlatus* was previously used by Linnæus, Hudson, Lightfoot, Witheridge and other authors.

P. trichotera Hue. This is the plant usually known as *P. perlata* in this country. Hue considers that *P. perlata* Ach. is not the same plant as the one usually known as *P. perlata*, differing from it in some thalline characters and especially in the chemical reaction when potash is followed by chloride of lime. In *P. perlata* Ach. a rosy tint is given to the medulla, whilst in *P. trichotera* the medulla is unaltered. I have examined many specimens from various British localities, and the reaction is nearly always that of *P. trichotera* Hue.

P. pilosella Hue is more or less synonymous with the subspecies *P. ciliata* Nyl. (Cromb. Br. Lich. i. p. 233), but is restricted to the more extreme forms. Many of the plants placed by British lichenologists under *P. ciliata* Nyl. could not be placed with *P. pilosella* Hue.

P. perlata Ach. (*sec.* Hue). Medulla KC rosy. On rock and tree near Otterford (5)—form. nov. *microphylla*. On wall, Combe St. Nicholas (5). This is a form with short lobes, those in the centre being finely laciniate-lobulate and often sorediate. A similar form is described under *P. trichotera* in Harmand's *Lichens de France*.

P. cetrata Ach. According to Hue and Harmand this is the *P. perforata* of many recent authors. Rhizinæ are present on the under surface almost up to the margin, whereas in *P. perforata* Ach. they are absent for some distance from the margin.—The form *ciliosa* Hue (*P. perforata* form *ciliata* Nyl.) is less common than the sorediate form (f. *sorediifera* Wain). On rock, Loch Gal, Kerry (T. Hebden).

P. perforata var. *Claudelii* Harm. On rock, Horner Wood, near Porlock (5).

P. lævigata (Sm.) Ach. The reaction of the medulla to chloride of lime is given as negative by Crombie. Harmand comments on this and states that the medulla becomes a faint rose tint. Leighton gives the colour reaction as red. I have examined a number of plants referred to this species and find that the reaction is usually negative. The medulla of a specimen collected by Dr. Parsons from granite rocks, Lustleigh Cleeve (3), had a pale-red reaction. Other specimens with a negative colouration in the medulla, and of which I have definite notes, were collected on rocks at Simonsbath (5), Harlech and

Artro valley (48), Llanberis, Capel Curig and Cwm-y-glo (49) and Loch Gal, Kerry.

P. xanthomyela Nyl. Loch Gal, Kerry (T. Hebden).

P. revoluta Flk. is not uncommon in Somerset. It occurs on rocks but is more frequent on trees, especially birch and beech, but sometimes on sycamore, ash, oak, larch, etc. Braunton, c. fr. (4), Exmoor and Quantock Combes (5), Kingsettle hill and Beckington (6), Loch Gal, Kerry (T. Hebden).—Form *minor* Harm. Cricket St. Thomas, Blackdowns and Quantocks (5).—Var. *rugosa* (Tayl.) Cromb. Kingsettle hill (6).

P. tiliacea (Hoffm.) Ach. On tree-trunks, Castle Neroche and Milverton (5).

P. omphalodes var. *panniformis* Ach. appears to be only a form more or less confluent with the type and similarly somewhat variable in colour. Ashburton (3), Llanberis (49), Keighley (63), Tyndrum and Killin (88), Ben Doran (98).

P. dubia (Wulf.) Schaer. is *P. Borreri* of many authors. *Lichen dubius* Wulf. (1790) antedates Turner's specific name of *Borreri* (1808). Plants grown in the shade are often of a yellowish-green colour and, to the casual observer, look like small specimens of *P. caperata*.

P. exasperata (Ach.) Nyl. is of less frequent occurrence than the numerous records imply.

P. fuliginosa var. *lætevirens* (Flot.) Nyl. is not uncommon on trees. The form in which the isidia are scarce or absent is var. *glabratula* (Lamy.) Oliv. (= form *denudata* Cromb.). Quantocks (5).

P. physodes form *tubulosa* (Schaer.) Mudd is a more distinct form than *labrosa*, but there does not seem to be any justification for raising it to specific rank as Bitter has done; even a varietal status is questionable. It is fairly frequent in Somerset and in other parts of the country.—Var. *platyphylla* Ach. is not uncommon in Somerset, and I think ought to be considered as a form.

Xanthoria parietina form *virescens* Nyl. and form *cinerascens* Leight. are not uncommon states. They are occasionally met with in Somerset. Both these states are included in form *chlorina* Malbr. and are usually found in more shaded places than the type.

Physcia pulverulenta (Schreb.) Nyl. is a much less common plant than *P. aipolia* var. *cercidia.*—Form *deminuta* Cromb. Orchard Portman (5).—Var. *subvenusta* Nyl. Braunton (4), Taunton district (5).

P. farrea (Ach.) Wain. Form *pityrea* (Ach,) Wain. is the common form often known as *P. pityrea*. Form *alphiphora* (Ach.) Harm. is less common and has a white and pruinose thallus. On a brick wall, Norton Fitzwarren (5).

P. tenella (Scop.) Arn. (= *P. leptalea* var. *tenella* Oliv.). Form *subbreviata* Nyl. is a less hooded and more sorediate form. On tree, Norton Fitzwarren (5). Form *exempta* Th. Fr. is considered by Wainio to be a squamiform and corticicolous form of *P. tribacia*. Crombie (Br. Lich. i. p. 313) mentions that Borrer referred the specimen to *P. erosa*, and this is placed by Wainio under *P. tribacia*.

P. obscura var. *virella* (Ach.) Th. Fr. has a rather infrequent form *flavescens* Cromb. (f. *Hueiana* Harm.). The medulla gives a purplish reaction owing to the intimate association of the plant with *Xanthoria parietina*. When the plant grows with *Parmelia fuliginosa*, the medulla of another state may give a reddish colouration with chloride of lime.

Placodium elegans var. *tenuis* Wahl. Bwlch Gwyn (50).

P. murorum (Hoffm.) D. C. Taunton and Chard (5), Bleadon and Bruton (6).

P. aurantium (Pers.) = *P. callopismum* (Ach.) Merat. The type is not common. Orchard Portman and Quantoxhead (5), Brean Down, Shapwick and High Ham (6), Burton Bradstock (8), Ross (36).—Var. *plicatum* (Wedd.) is the common plant which is often called *Lecanora sympageum*, a name to which it has no right, *Lichen sympageus* Ach. being merely a colour form of the type. Hue's name for this plant is *L. Heppiana*.

P. microthallinum (Wedd.) Oliv. is a plant very similar to *P. lobulatum* (Somm.) Hepp. There seems to be no real distinction between the two except that the former grows on *Verrucaria maura*: this habitat is common for plants named *P. lobulatum* by British lichenologists.

Squamaria subcircinata (Nyl.) Oliv. On sarsen stone, Staple Fitzpaine (5).

Diphratora candicans (Dicks.) Jatta. Chard and Taunton districts (5), Mendip (6), Symond's Yat (34), Backbury Camp (36), Ingleton (65). *L. candicans* Schaer. because of its uniseptate spores is excluded from *Placodium* or *Pyrenodesmia*. The radiately-lobed thallus separates the genus *Diphratora* from *Lecania*.

Candelaria concolor (Dicks.) Arn. = *L. laciniosa* Nyl.

Callopisma epixanthum (Ach.) A. L. Sm. Taunton (5), Shapwick (6).

C. citrinum (Hoffm.) Koerb. is usually on mortar, but often spreads out over the surrounding rock and occasionally over soil or decaying moss.

C. erythrellum form. nov. *ecrustaceum*. Apothecia and spores as in the type, but the thallus is absent or scarcely visible. It forms extensive patches on the White Lias cliff at East Quantoxhead (5). Miss A. L Smith kindly tested this plant.

C. cerinum form *cyanoleprum* (D. C.). On pale, High Ham (6) and Orchard Portman (5).

C. hæmatites (Charb.). On tree, Buckden (64, T. Hebden).

C. pyraceum (Ach.) Arn. Winsham and Aisholt (5), Road (6).—Var. *pyrithoma* (Ach.). Merridge near Bridgwater (5).

C. vitellinulum (Nyl.) Arn. Torquay (3), Cheddon and Corfe (5), Shapwick (6).

Leproplaca xantholyta Nyl. On dolomitic conglomerate, Shipham (6).

Lecanora galactina var. *dispersa* (Pers.) Ach. and var. *dissipata* (Nyl.) B. de Lesd. Taunton (5).—Var. *urbana* (Nyl.) Harm. Cheddon Fitzpaine and Kingston (5).

L. subfusca. In this group Crombie, following Nylander, attached much importance to the septation and discreteness of the paraphyses and the amount of inspersion of the epithecium with granules. Modern students find that there is a fair amount of variation in these internal characters, and that too much importance has been attached to them during the determination of species. The nomenclature of Hue corresponds fairly well with that given in Crombie's Monograph, though some species are reduced to varieties or forms, whilst some varieties are raised to specific rank.

L. subfusca (L.) Nyl. The type (f. *typica* Harm.) is not uncommon in Somerset. Var. *glabrata* Ach. occurs at Porlock and Taunton (5).

L. chlarona form *geographica* (Mass.) Nyl. Stoke St. Mary and Merridge near Bridgwater (5). Similar forms have been found for *L. subfusca*, *L. albella* and *L. intumescens*, at Aisholt (5). Miss A. Lorrain Smith and Mr. Hebden kindly tested these forms.

L. atrynea (Ach.) Nyl. Thurlbear (5), Benderloch (98, T. Hebden).

L. gangaleoides form *glebulosa* Harm. Llanberis (49).

L. intumescens (Reb.) Krb. Chard, Horner and Aisholt (5).

L. albella (Pers.) Ach. is fairly frequent in Somerset.—Form *subalbella* Nyl. Castle Cary (6).—Form *peralbella* Nyl. Staple hill (5).

L. campestris (Schaer.) Nyl. Form *detrita* (Harmand, p. 976), with the apothecia aborted or altered, seems to be more frequent in this species than in the other members of the *subfusca* group.

L. glaucoma form *complanata* Leight. On Lynton slate wall, Merridge near Bridgwater (5).

L. umbrina (Ehrh.) Mass. On rock, Taunton (5).—Var. *Hageni* (Ach.) Cromb. Crowcombe and Minehead (5).

L. crenulata (Dicks.) Nyl. On limestone walls and cement, Taunton (5), Mendip (6), Magnesian limestone wall, South Milford (64).

L. varia (Ehrh.) Ach. is not uncommon on the stems of ling.

L. conizæa (Ach.) Nyl. Alcombe and Exton (5).

L. symmicta Ach. is distinguished from the commoner *L. expallens* by its more determinate thallus, and the absence or little distinctness of the thalline margin to the apothecium. Quantock Combes, Exmoor Staple hill and Puckington (5), High Ham (6).

L. subtartarea Nyl. Harlech (48), Llanberis (49), Ben Lui (87)

Lecania erysibe form *cinereofusca* (Mudd). On calcareous rock, Brean Down (6).—Var. *proteiformis* (Mass.) = var. *Rabenhorstii* (Hepp.) Oliv. On top of calcareous wall near Taunton (*teste* T. Hebden) and Crowcombe (5).

Rinodina confragosa (Ach.) Massal. On sarsen stone, Fifield (8).

R. umbrinofusca (Nyl.). On rock of river wall, Burnham (6), *teste* T. Hebden.

Aspicilia cinerea (Ach.) Krb. is the dominant lichen on the shingle at Greenaleigh Point near Minehead (5).

A. gibbosa (Dicks.) Krb. On sarsen stone, Codford (8); on beach shingle, Pevensey (13).

A. Dicksonii (Ach.) A. L. Sm. is a rather frequent plant of mountain regions. Horner (5), Llanberis (49).

A. Prevostii (Fr.) Th. Fr. On dolomitic conglomerate, Shipham, and on limestone, Mendip (6).

A. pruinosa form *nuda* (Nyl.) is not an uncommon form and often occurs with the type. Taunton and Chard districts (5), Keighley (63).

P. leptospora Nitsch. is often placed under *P. multipuncta*, but is distinguished from it by the reddish supplementary reaction of the thallus to potash, the fewer apothecia in the verrucæ and the smaller spores. On mountain ash, Croydon hill (5). On birch, Horner wood (5). This species has not been previously recorded from the British Isles.

P. velata (Turn.) Nyl. Exton (5), Artro valley (48).—Form *aspergilla* (Ach.) Cromb. Hodder's Combe (5), Artro wood (48).

P. lactea (L.) Nyl. On shingle of beach near Minehead (5).

P. communis var. *leiotera* Nyl. The thallus is thinner and the apothecia are more discrete and less difform than in the type. On oak, Orchard Portman (5).—Var. *rupestris* D. C. On rocks. Merridge near Bridgwater (5), Harlech (48), Llanberis (49), Killin (88).

P. ceuthocarpa (Sm.) T. & B. On rock, Achmore, Killin (88).

P. leioplaca form *octospora* Nyl. Puckington (5).—Form *juglandis* Hepp. On trunk of old beech, Broomfield (5). The thallus is white and the apothecial verrucæ are nearer together than in the type.

P. scutellata Hue is a somewhat provisional name given to sterile plants whose thalli and soredia do not give any colourations with potash, chloride of lime, iodine, or with potash followed by chloride of lime. It is not uncommon in Somerset and has been found in many other parts of the British Isles.

Thelotrema lepadinum var. *scutelliforme* Ach. On old holly and oak trees, Quantock Combes (5), Fritham (11).

Urceolaria scruposa var. *bryophila* form *parasitica* (Smrf.) = f. *lichenicola* (M. et Fr.). On *Cladonia pyxidata* var. *pocillum*, sand dunes, Braunton (4), Berrow (6).

Lecidea decipiens (Ehrh.) Ach. On soil-cap of old calcareous wall, Bruton (6).

L. prærimata Nyl. Treborough (5).

L. granulosa form *viridula* Cromb. On peaty ground in orbicular patches from a few inches to a foot in diameter, Skipwith Common (61). Usually sterile.

L. flexuosa (Fr.) Nyl. On pale, Loch Bi (98).

L. uliginosa (Schrad.) Ach. has for its algal symbiont *Protococcus viridis*, but occasionally Glœocapsæ and other algæ are present, and may be actually included in the thallus.—Form *humosa* (Ehrh.) Ach. Bare soil of bank, Broomfield (5). The spores in this specimen are $25 \times 11\text{–}12\,\mu$ and larger than those of the type from the same locality.

L. protrusa var. *subviridans* (Nyl.) A. L. Sm. Merridge near Bridgwater and Greenaleigh Point (5).

L. dubia (Borr.) Hook. The differences between this species and *L. parasema* v. *flavens* are very slight. The more pulverulent thallus has an orange colouration with chloride of lime, but this reaction also occurs in *L. parasema*, especially in the varieties *elæochroma* and *flavens*. The colouration is, however, more definite and the paraphyses are more distinct and discrete than in *L. parasema*. On old pales, Staple hill (5), High Ham (6).

L. parasema var. *flavens* Nyl. On trunks of trees, Braunton (4), Stoke St. Mary and Treborough (5).—Var. *tabescens* (Krb.) Leight. has a greater value than that of a form, and almost seems worthy of a specific rank, owing to the indistinctness of the hypothallus and the colour of the apothecia. The reactions of the thallus are variable in the same specimen, the apothecia may be livid brown, dark-brown, dark reddish or dark greenish-blue, and the tips of the paraphyses may not have the bluish tinge characteristic of *L. parasema*. On trees and pales, Brendon Hill and Holway, near Taunton (5).

L. sublatypea Leight. Cheddon Fitzpaine (5).

L. arctica Somm. On mosses at 3700 feet, Ben Lui (87 and 88), also seen on Ben Lawers in 1913.

L. corollida Stirt. On rock near Washford (5). Mr. Hebden agrees with my determination, and says that the thallus "suggests a depauperate condition such as occurs in many other lichens."

L. contigua (Hoffm.) Fr. The forms *limitata* Leight. *leprosa* Leight. *nobilis* (Fr.) Leight. *Hoffmanni* Leight. are general and common.—Form *pustulata* Leight. Blagdon hill (5).—Var. *calcarea* Fr. The varietal name is not suggestive of the habitat but of the creamy-white colour. The apothecia at first are more or less innate. On siliceous rock, near Roadwater (5).—Var. *percontigua* (Nyl.) A. L. Sm. Morthoe (4).—Var. *platycarpa* (Ach.) Fr. Quantocks (5), Harlech and Cwm Bychan (48), Llanberis (49), Nant-y-Ffrith (50), Ffrith (51), Greenfield (63), Ben Lui (87), Tyndrum and Killin (88).—Form *hydrophila* (Fr.). The thallus has a milky colour and the apothecia are more tumid and convex. On water-washed rocks, Quantocks (5), Greenfield (63), Loch Tulla (98).—Var. *flavicunda* (Ach.) Nyl. Common on rocks in hilly regions. Harlech and Cwm Bychan (48), Llanberis (49), Ben Lui (87), Killin and Tyndrum (88).

L. sorediza Nyl. Hodder's Combe (5), Bleadon (6), Ben Lui (87 and 88).—Form *depauperata* Cromb. Bleadon (5).

L. crustulata (Ach.) Krb. Castle Neroche and Dunkery (5), near Oswestry (40, T. Hebden), Snowdon (49), Ben Lui (87), Tyndrum and Killin hills (88). The form *fuscella* (Mudd) A. L. Sm. is the common one and usually occurs on hard siliceous rocks.

L. sympathetica Tayl. Stoke St. Mary, Thurlbear and East Quantoxhead (5). The habitat of this plant is usually given as sandstone, but my specimens occur on White Lias rocks, walls and stones. Mr. Hebden also finds the plant on a calcareous substratum. The thalline reactions are K—C—.

L. confluens form *oxydata* Leight. Recorded from Ben Lawers and seen there in 1913.

L. tessellata Flk. On rocks over 3500 feet, Ben Lui (87 and 88). Seen on Ben Lawers in 1913.

L. fuscoatra (L.) Ach. Tyndrum and Killin hills (88), Ben Doran (98).

L. Kochiana Hepp. On boulders in R. Glaslyn (48).

L. sylvicola var. *infidula* (Nyl.) Cromb. Blagdon hill and near Washford (5).

L. expansa Nyl. Blue Anchor and Broomfield (5).

L. pycnocarpa Krb. Ben Lui (88), Ben Doran (98). Seen on Ben Lawers in 1913.

Biatorina littorella (Nyl.) A. L. Sm. On Devonian slate, Broomfield (5) *teste* T. Hebden.

B. graniformis (Hag.) A. L. Sm. Shapwick (6). Whitby (62, T. Hebden).

B. Lightfootii var. *commutata* (Ach.) Mudd. Holford and Chard Common (5).

B. atropurpurea (Schaer.) Massal. On trunk of tree in wood above Pitminster (5). According to Mr. Hebden this is form *atropurpurascens* (Nyl.) since the hymenial gelatine is persistently blue with iodine.

Bilimbia sabuletorum form. nov. *viridis.* Differs from the type in the green and thicker thallus. Base of walls, Harden Moor (63), from T. Hebden.

Bacidia inundata Krb. On siliceous stone, at times inundated, Smith's Combe, Quantocks (5).

B. muscorum (Web.) Mudd. On mossy sand-hills, Berrow (6); on mossy soil-cap of wall, Ross (36).

Buellia canescens (Dicks.) de Not. is frequently found with apothecia in Somerset. A furfuraceous form often occurs.

B. spuria (Schaer.) Krb. On rock of cliff, Woolacombe (4); on sarsen stone, Fifield (7).

B. verruculosa (Borr.) Mudd. On wall, Cheddon (5).

B. coniops (Wahl.) Th. Fr. On shingle of beach, Minehead (5).

B. confervoides Kremp. On shingle, Bossington (5).

Leciographa parasitica (Flk.) Mass. has no specific preference for growing on *Pertusaria communis*, it occurs on *P. Wulfenii* at Broomfield and Winsham (5).

Rhizocarpon geographicum var. *atrovirens* (L.) Krb. Llanberis (49).

R. petræum form *impressulum* (Leight.) A. L. Sm. is not confined to calcareous rock. It is found on a siliceous rock near Roadwater (5).—Var. *excentricum* (Ach.) A. L. Sm. Galmpton and Churston (3).

R. confervoides D. C. form *cinereum* (Flot.) A. L. Sm. is a common form of flints or similar hard siliceous rocks. Blackdowns (5), Pevensey (13), Wendover (24), near Stafford (39), Harlech (48), Llanberis (49), Bwlch Gwyn (50).—Form *coracinum* (Flot.) A. L. Sm. also occurs on flints, Blackdowns (5).—Forms *dispersum* (Leight.) A. L. Sm. Cheddon (5), and *albicans* (Flot.) A. L. Sm. Aisholt (5), are rarer.

R. obscuratum (Ach.) Mass. Holford (5), near Harlech (48), Llanberis (49).

(To be continued.)

NOTES ON SEDUM.

By R. Lloyd Praeger.

Sedum arboreum Masters in Gard. Chron. 1878, ii. 717.

Masters found this plant in cultivation at Kew and elsewhere labelled *Sedum arboreum* or *S. arborescens*, and described it under the former name, though this was already occupied by a plant of Ortega's (= *Crassula portulacea* Lam.). Its habitat was unknown, and no fresh light appears to have been thrown upon it since. Under the name *S. arboreum* a Sedum which is clearly Masters's plant is still in cultivation; this is obviously a form of the Mexican *S. moranense* H. B. K. (*S. Liebmannianum* et *S. Greggii* hort. nonnull., nec Hemsley). *S. moranense* appears to be one of the hardiest species in the whole Mexican Sedum flora, and survives ordinary winters throughout the British Isles, so far as I am aware. *S. arboreum* as found in gardens differs considerably in appearance from *S. moranense* type, and though the differences are chiefly due to habit, it seems worthy of varietal rank, as follows:—

S. moranense H. B. K. var. arboreum (Masters) Praeger, nov. comb.

Stem erect; branches fastigiate (not wide-spreading as in the type), with a tendency to fasciation at the tips. Plant 15–30 cm. high (instead of 5–8 cm. as in type), forming a small strict bush with a single stem up to 5 mm. thick (instead of a low loose mass frequently rooting, as in the type).

Masters's description would appear to apply to a form somewhat intermediate between the type and the variety, but as he mentions the curious tendency to fasciation (which I have never seen in the type, though I have received and grown it from many sources), and as the name *S. arboreum* is applied in gardens to the variety, I have retained Masters's name for this form.

A fine specimen in the Kew Herbarium collected by C. G. Pringle at 10,000 feet in Sierra de Pachuca, shows that var. *arboreum* is a native Mexican form.

Sedum Beyrichianum Masters in Gard. Chron. 1878, ii. 376.

Masters (*l. c.*) described under the name *S. Beyrichianum* a plant from an unspecified garden source, stating that the name appeared in several nursery catalogues. The plant is described as resembling *S. Nevii*, but having petals no longer than the sepals (instead of twice as long, as in *Nevii*); the leaves are stated to be narrower, and the flowers exceedingly small, ⅛ inch diameter (against nearly ½ inch in *Nevii*). No fresh light has been forthcoming regarding this plant during the intervening period for nearly forty years.

There is in the Kew Herbarium a specimen certified by N. E. Brown as being identical with Masters's original *Beyrichianum* (which Masters would appear to have seen at Kew). This plant is also identical with that which is still to be seen in cultivation here and there as *S. Beyrichianum*, which I have received and grown from three sources—Messrs. Regel & Kesselring of Petrograd, Glasnevin Botanic Garden, and Mr. Murray Hornibrook of Abbeyleix, Queen's County. A study of these and of a good series of *S. Nevii* during several seasons shows (1) that the flower of both is ½ inch or slightly less in diameter; (2) that in both the relative length of petal to sepal varies by about the same amount, the petals being slightly longer to slightly shorter (usually longer) than the sepals; (3) that none of the specimens of *Nevii* have petals so much as twice the length of the sepals as described by Masters, nor any of the plants of *Beyrichianum* petals so short (flower ⅛ inch diameter) as described by him; (4) that well-marked differences of stem and leaf exist between the two forms, entitling *S. Beyrichianum* to varietal rank.

I believe that Masters's *Nevii* (assuming his description to be accurately printed) was a specimen with abnormally short sepals, and that his *Beyrichianum* had its petals only partially developed (which has sometimes happened with Sedums in my collection owing to attacks of green-fly); in the Kew specimen certified by N. E. Brown, the petals are only ½ longer than the sepals. Masters was right in regarding the two plants as not identical, though the differences are in stem and leaf rather than in flower. I would propose that *S. Beyrichianum* should stand as follows:—

S. NEVII A. Gray var. BEYRICHIANUM (Masters) Praeger, nov. comb.

Plant more diffuse and rather greener. Barren shoots longer with more distant leaves and a very lax terminal rosette; leaves narrower. Floral parts as in type.

The absence of the close clustered compact leaf-rosettes which characterize typical *Nevii* give the variety a very distinct appearance. That the latter is a native American form is shown by a good specimen in the British Museum Herbarium labelled *S. Nevii*, from Peaks of Otter, Virginia, collected by A. H. Curtiss in 1872; this is even more diffuse and slender than the cultivated *Beyrichianum*.

SEDUM DRUCEI Graebner in Bot. Exch. Club Report for 1912, 160 (1913).

This name represents the plant which in the British Isles we have been accustomed to call *S. acre* L. Dr. Graebner in his description distinguishes it especially by its long lax stems and mitriform distant leaves. He adds "It is at once distinguished from *S. acre* by the loosely placed, narrow, divergent leaves, which call to mind *S. boloniense*." Mr. Druce adds (*l. c.*) that Dr. Graebner cultivated it in the Berlin Botanic Gardens side by side with the continental *acre*, and found it kept quite distinct: and that "Mr. Ogilvy and Mr. Wilmot[t] also assure me that the ordinary German *acre* has quite a different facies."

In face of this august assemblage of opinion it may seem irreverent to doubt, but I feel impelled to record my own observations. I collected "*S. Drucei*" in company with Dr. Graebner in the west of Ireland, and plants which appeared to me indistinguishable from it in half a dozen other Irish localities, at Edinburgh, and a couple of south of England stations: and by the kindness of friends have received other English and Scottish gatherings. I also collected or received "*S. acre*" from stations in Belgium, France, and Germany, and from garden sources in Russia, Sweden, Holland, Italy, Austria, &c. The plants were all grown in one border under similar conditions. They displayed a certain amount of variation; but I found it impossible to separate them into groups—either *Drucei* and *acre*, or any other series of two or more segregates. "*Drucei*" varied quite as much as "*acre*," and varied in the same directions; I failed to find any character in any one of the series which would justify even a varietal name applied in the ordinary sense. There were certainly compact forms and lax forms, and the leaf-form varied to a certain extent; but these hailed both from the British Isles and from the continent. West of Ireland seaside forms were sometimes very large and lax as collected, but they lost this character when grown dry. Compact forms from limestone rocks in central Ireland compared fresh with German *acre* were indistinguishable.

It may be that I am not gifted with a critical eye; but I would suggest that many of the European species of *Sedum*—for instance, *S. album*, *S. anopetalum*, *S. dasyphyllum*, *S. reflexum*, to quote familiar examples—display a far wider range of variation than is found in *S. acre* (including *Drucei*); many of the forms of these have a distinct geographical range; and until there is some agreement among botanists that each of these should be divided into a number of species, it seems to me only misleading to create a "species" out of *Drucei*.

No doubt it will be shown eventually that in the case of a large number of our plants the British forms differ slightly from continental types; it would be surprising if this were not so, in view of the length of the period of their isolation, and the difference of the climatic conditions under which they live. Similar differences no doubt exist as between the English and the Irish floras—Mr. Moyle Rogers has remarked that Irish Brambles seldom match satisfactorily with the English plants. The study of these incipient variations, where perhaps we see species in the making, is full of interest, and there is no more important branch of field botany. But I think one may without offence protest against the use of binominals for plants displaying these slight divergences from type, at all events in a genus where the great majority of the species are distinct and well defined. Even though we may not be able to define what we mean by a species, binominals are yet used by general agreement in a certain sense; and their employment in the case of plants showing differences which most botanists would consider sub-varietal or less, will hinder rather than help the progress of systematic botany.

SEDUM PRUINATUM Brotero, Flor. Lusit. ii. 209 (1804).

This plant, one of the most interesting and distinct of European Sedums, was long confused with *S. rupestre* L. (*S. elegans* Lej.), but several writers during the last thirty years—*e. g.* Mariz in Bol. Soc. Broteriana, vi. 21, 1888; R. P. Murray in Journ. Bot. xxvii. 141, 1889; Rouy, Illustr. Pl. Eur. Rar., fasc. x. 77; Rouy & Camus, Fl. de France, vii. 111 (footnote), 1901—have pointed out its true character. Being an extremely local plant, it is rare in herbaria, and has been hitherto unknown in gardens, so far as I am aware. By the kindness of Prof. Henriques of Coimbra, who sent me a fine gathering from the mountains of that part of Portugal, I have had the plant in cultivation for two years, and a few notes on it may be useful. Though the leaves resemble somewhat closely those of a lax glaucous form of *S. reflexum*, so that in the barren state it recalls that species more than any other, it very distinct inflorescence at once betrays its close affinity to the South European *S. amplexicaule* L. It has the same very lax cyme of two branches, with one flower in the fork, and two or three on either branch. The flowers are very large for a Sedum, up to ¾ inch in diameter, of a clear straw colour, with patent linear petals, six or seven in number. The sepals also show affinity to *S. amplexicaule* in the very unusual thickening of the edges, which is so marked a feature of the latter species; in *S. pruinatum* this is less pronounced. The plant has also the wiry slenderness of *amplexicaule*. It shows no trace, however, of the peculiar expanded leaf-base which renders *S. amplexicaule* unique among Sedums. In its mode of vegetative propagation it is quite peculiar. From the axils of some of the leaves in spring slender horizontal shoots arise. They produce distant leaves, do not root, and grow to a length of 6 or even 9 inches. Then the tip of the shoot becomes erect, and if it is in contact with the ground it roots. Except the tip, the shoot soon drops its leaves, and then dies, but remains like a fine wire throughout the winter, joining the living tip, which forms a loose oblong bud, to the parent. The erect central shoot, from which the rest originated, has meanwhile flowered and died, or has remained a barren shoot to flower in the succeeding year, when each of the rooted tips goes through the same growth-cycle. The plant has a most distinct appearance, and the contrast between its very glaucous foliage and straw-yellow flowers is pleasing.

I have a good stock of *S. pruinatum* at present, and if any gardener-botanist would like to grow it, I shall be happy to send a plant. It appears to prefer a light dry humus soil, and its root-system is of the flimsiest description.

S. SARMENTOSUM Masters in Gard. Chron. 1878, ii. 626 (excl. var.) (nec *S. sarmentosum* Bunge).

Masters's description of "*S. sarmentosum* Bunge" clearly does not apply to that species, which is an interesting Chinese plant, well known in cultivation. Maximowicz, dealing with the Asiatic Sedums, remarks of the former "planta . . . mihi ignota." This is the only reference to it which I know. Masters got much of his material at Kew Gardens, and an examination of the Sedums there revealed a plant in the Succulent House, noteworthy on account of its bright green whorled linear leaves, which was clearly Masters's species, and was, indeed, still labelled *S. sarmentosum*. The plant was puzzling, and I took it to be possibly one of the numerous species of the *Japonica* section of *Sedum* which are now known to occur in China. I saw it next at Dahlem, named *S. reflexum*—which did not help much—but later, at Bremen, found it labelled as grown from Mexican seed. With this clue, it was run down as *S. mexicanum* Britton, a determination subsequently confirmed by specimens from New York. How *S. mexicanum*, which was described in 1899 from specimens raised in New York from seed collected near Mexico City, came to be in cultivation at Kew forty years ago, is not known. The variety mentioned by Masters has no connection with *S. mexicanum.* It is still frequently grown as *S. sarmentosum variegatum* or *S. carneum variegatum*, but is in reality a sport of *S. lineare* Thunb., a Japanese ally of *S. sarmentosum.*

S. Woodwardii N. E. Brown in Kew Bull. 1912, 390.

S. Woodwardii was described from a specimen sent to Kew by the late Mr. Robert Woodward of Arley Castle, where the plant appeared in a bed of seedlings of a *Sambucus* from the Rocky Mountains. With these it had clearly no geographical affinity, as it belonged to the *Aizoon* group of Sedum, which is confined to N.E. and E. Asia, and it was probably a stray seedling from a bed a few yards away, which contained seedlings of Chinese plants collected by Wilson. Its proximity to *S. Aizoon* L. was recognized:—"affinis *S. Aizoo* Linn., sed foliis obovatis obliquis obtuse dentatis et cymis majoribus laxioribusque differt." The type specimen at Kew is poor; but in a second one, apparently taken subsequently from a root grown at Kew, the special characters quoted above have to a great extent disappeared. By the kindness of Mr. Woodward, I received from him a short time before his ultimely death fine specimens of the plant, which appeared to be *S. Aizoon* grown large and lax in rich soil and half shade. These, cultivated in an open border with *S. Aizoon* forms, are now not separable from them, even by characters of varietal value. *S. Aizoon* is a variable species; in breadth and toothing of leaf, and size and denseness of inflorescence considerable diversity exists; *S. Woodwardii* is not an extreme form as regards any of these characters.

SOME BRAZILIAN PLANTS.

By R. C. Davie, M.A., D.Sc.

The plants named in this list were collected during a visit to the States of Rio de Janeiro and São Paulo in July, August and September, 1914. The object of the visit, in which I was aided by a Royal Society (Government) Grant, was the collection of flowers of the native *Leguminosæ.*

No attempt was made to collect and dry specimens of plants representative of the floras of the districts visited, but interesting plants which happened to be noticed during the search for leguminous flowers were gathered from time to time. Among them were various species which are poorly represented in British herbaria; two prove to be new. As far as can be ascertained, several of the species have not previously been recorded for the districts in which I found them.

An interesting point which has appeared during the working up of the plants is that many of the "campo" plants stand closer to Burchell's specimens than to the Martian types. As Burchell's plants were not examined for the *Flora Brasiliensis* they are mainly included under the species named there. I prefer to follow the *Flora* for the present rather than to separate my specimens as new while Burchell's remain unworked.

The plants were identified partly at Edinburgh and partly at Kew, and I desire to express my thanks to the Regius Keeper of the Royal Botanic Garden, Edinburgh, and to the Director of the Royal Gardens, Kew, for facilities afforded me during the process of identification. Much valuable assistance was given me at Kew by Mr. M. B. Scott; and Mr. W. G. Craib, at Kew and more recently as my colleague in Edinburgh has given ungrudgingly of his time and special knowledge during the preparation of the list. The orchids were named by Mr. R. A. Rolfe.

The nomenclature for the flowering plants is that of Martius's *Flora Brasiliensis*; the ferns are named according to Christensen's *Index Filicum*. A complete set of the specimens is in the Herbarium of the Royal Botanic Garden, Edinburgh. E. = Estado (state).

Cissampelos ovalifolia DC. Grassy bank on campo, Georges Oetterer, E. São Paulo, 2500 ft., n. 127.

Argemone mexicana L. Rocks at São Francisco, Nictheroy, sea-level, n. 120.

Cleome spinosa L. In scrub on bank of River Bengala, Novo Friburgo, 4000 ft., n. 117.

Polygala Cyparissias A. St. Hil. On loose sand close to the sea, Gavea Beach, south of Rio de Janeiro, n. 189.

P. paniculata L. Roadside in Jardim Botanico, Rio de Janeiro, sea-level, n. 175.

Monnina cordata Klotzsch. Open argillaceous campo, Ipanema, E. São Paulo, 2500 ft., n. 136.

Cerastium viscosum L. On the railway track below Alto da Serra, Therezopolis, Serra dos Orgãos, 4000 ft., n. 168.

Marcgravia myriostigma Tr. & Planch. In rain-forest below Alto da Serra, Petropolis, 2000 ft., nn. 118, 191.

Luhea speciosa Willd. Tree on open argillaceous campo, Ipanema, E. São Paulo, 2500 ft., n. 149.

Heteropteris thyrsoidea A. Juss. Shrub on open campo, Ipanema, E. São Paulo, 2500 ft., n. 110.

Oxalis Martiana Zucc. Pathside in forest below Alto da Serra, Therezopolis, 4000 ft., n. 161.

Ouratea oliviformis (St. Hil.) Engl. Shrub of open argillaceous campo, Ipanema, E. São Paulo, 2500 ft., n. 130.

Hippocratea flaccida Peyr. In rain-forest at Cantareira, near São Paulo, 3000 ft., n. 146.

Anacardium occidentale L. On restinga near sea, Praia de Leblond, Rio de Janeiro, sea-level, n. 181.

A. humile St. Hil. Undershrub of open argillaceous campo, Ipanema, E. São Paulo, 2500 ft., n. 128.

Inga cordistipula Mart. Shrub, Jardim Botanico, Rio de Janeiro, sea-level, nn. 66, 85.

Inga marginata Willd. Tree in rain-forest, Alto de Serra, Petropolis, 2500 ft., n. 48.

I. Thibaudiana DC. Tree in rain-forest, Raiz de Serra, below Petropolis, 1000 ft., n. 47.

Pithecolobium Langsdorfii Benth. Dr. von Thering's garden of native plants, Museu Paulista, Ypiranga, São Paulo, 2500 ft., n. 35.

Acacia pedicellata Benth. Small tree in rain-forest above Gavea, near Rio de Janeiro, 1000 ft., n. 56.

Mimosa asperata L. Straggler, prostrate on sand on edge of Lagoa de Rodrigo Freitas, sea-level, n. 69.

M. subsericea Benth. Undershrub of open campo, Georges Oetterer, E. São Paulo, 2500 ft., n. 32.

Desmanthus virgatus Willd. Tree in scrub on shore at Nictheroy, nn. 41, 87.

Bauhinia rufa Steud. var. *cordata* Vog. On open grassy campo, Georges Oetterer, E. São Paulo, 2500 ft., n. 25.

Cassia cathartica Mart. On open campo, Ipanema, E. São Paulo, 2500 ft., n. 28.

C. flexuosa L. On open hillside, Hygienopolis, São Paulo, 2500 ft., no. 33; riverside among low scrub, Novo Friburgo, 4000 ft., n. 38; waste ground on edge of forest, Jardim Botanico, Rio de Janeiro, sea-level, n. 55.

C. occidentalis L. On restinga, Praia de Ipanema, Rio de Janeiro, sea-level, n. 68.

C. pilifera Vog. Sandy bank on campo, Ipanema, E. São Paulo, 2500 ft., n. 36.

C. rotundifolia Pers. On roadside near military station, Ipanema, E. São Paulo, 2500 ft., n. 37.

C. uniflora Spreng. Undershrub of restinga, Praia de Leblond, Rio de Janeiro, sea-level, n. 63.

Sophora tomentosa L. Shrub, Jardim Botanico, Rio de Janeiro, sea-level, n. 65.

Crotalaria vitellina Ker-Gawl. Waste ground on edge of forest, Jardim Botanico, Rio de Janeiro, sea-level, n. 61.

Indigofera Anil L. On restinga at Leme, near Rio de Janeiro, sea-level, n. 54.

Æschynomene hispidula H. B. K. Undershrub of wet sand on edge of Lagoa de Rodrigo Freitas, Rio de Janeiro, sea-level, n. 70.

Stylosanthes guianensis Sw. On open grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 29.

S. scabra Vog. Prostrate shrub on dripping rocks in gorge at Riaz da Serra, below Petropolis, 1000 ft., n. 46.

S. viscosa Sw. Straggling shrub on sand on restinga at Praia de Leblond, Rio de Janeiro, sea-level, no. 44; on Gavea Beach, near Rio de Janeiro, sea-level, n. 58.

Zornia diphylla Pers. Undershrub of restinga, Praia de Leblond, Rio de Janeiro, sea-level, no. 67; on open hillside, Hygienopolis, São Paulo, 2500 ft., n. 98.

Desmodium adscendens DC. Edge of footpath beside laboratory in Jardim Botanico, Rio de Janeiro, sea-level, n. 50.

D. discolor Vog. Waste ground on edge of forest, Jardim Botanico, Rio de Janeiro, sea-level, n. 62.

Machærium uncinatum Benth. Tree of rain-forest at Alto da Serra, Petropolis, 2500 ft., nn. 51, 80.

M. violaceum Vog. Tree of rain-forest between Alto da Serra and Meio da Serra, below Petropolis, 2000 ft., n. 49.

Andira anthelminthica Benth. Tree of rain-forest at Cantareira, near São Paulo, 3000 ft., nn. 39, 82.

A. laurifolia Benth. Dwarf trees of open campo, Ipanema, E. São Paulo, 2500 ft., n. 26.

Erythrina Corallodendron L. Cultivated, Jardim Botanico, Rio de Janeiro, sea-level, nn. 45, 93.

E. glauca Willd. Large tree on roadside, near Jardim Botanico, Rio de Janeiro, sea-level, nn. 42, 79.

Collæa glaucescens Benth. (nn. 27, 86) and *C. rugosa* Benth. (nn. 31, 90). On roadside near campo, Ipanema, E. São Paulo, 2500 ft., nn. 27, 86.

Cajanus indicus Spreng. On roadside near Alto da Boa Vista, above Rio de Janeiro, 2000 ft., n. 43.

Eriosema heterophyllum Benth. On grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 30. Among low scrub near Museu Paulista. Ypiranga, near São Paulo, 2500 ft., n. 34.

Phaseolus prostratus Benth. var. *angustifolia* Benth. On grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 40.

Rubus rosifolius Sm. Pathsides and on the margin of the forest near Therezopolis, Serra dos Orgãos, 4000 ft., n. 167,

Eugenia Kunthiana DC. "Aracão do Campo." Open grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 139.

Stenocalyx Michelii Berg. "Pitanga." On restinga, close to sea, Praia do Pinto, Rio de Janeiro, n. 201.

Cambessedesia ilicifolia Triana. On grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 148.

Marcetia taxifolia DC. var. *pubescens* Cogn. On open granitic hillside, Morro dos Cabritos, Rio de Janeiro, 1200 ft., n. 193.

Acisanthera variabilis Triana. In marsh at Sant' Anna, São Paulo, 3000 ft., n. 145.

Cuphea ingrata Ch. & Sch. var. *grandifolia* St. Hil. On wet ground close to bare sandstone rocks, Serra dos Orgãos, near Therezopolis, 4000 ft., n. 169.

Casearia sylvestris Sw. In rain-forest and scrub, Cantareira, near São Paulo, 3000 ft., no. 113; in scrub, Sant' Anna, São Paulo, 3000 ft., n. 126.

Begonia paleata Alph. DC. In rain-forest, Serra dos Orgãos, near Therezopolis, 4000 ft., n. 162 (♂).

Hydrocotyle umbellata L. var. *bonariensis* (Lam.) Spreng. On marsh near Lagoa de Rodrigo Freitas, Rio de Janeiro, sea-level, n. 202.

Borreria capitata DC. (n. 246) and *B. verticillata* G. F. W. Meyer (nn. 183. 167). On restinga, Praia de Leblond, Rio de Janeiro, sea-level, n. 246.

Mitracarpus frigidus K. Schum. var. *Salzmannianus* Sch. On restinga, Praia de Leblond, Rio de Janeiro. sea-level, n. 182.

Lipostoma capitatum D. Don. On dripping red sandstone, near stream, between Therezopolis and Alto da Serra, Serra dos Orgãos, 4000 ft., n. 165.

Oldenlandia thesiifolia Schumann. In marsh at Sant' Anna, São Paulo, 3000 ft., n. 142.

Declieuxia cordigera Mart. ap. Zucc. var. *genuina* Müll. Arg. On open campo, Ipanema, E. São Paulo, 2500 ft., n. 137.

Emmeorhiza sp. On open grassy hillside, Morro dos Cabritos, Rio de Janeiro, 1000 ft., n. 123.

Acicarpha spathulata R. Br. var. *genuina*, C. A. Muell. On loose sand on Gavea Beach, near Rio de Janiero, sea-level, n. 196.

Achyrocline satureoides DC. On loose sand near sea, Praia de Leblond, Rio de Janeiro, sea-level, n. 200.

Epaltes brasiliensis DC. On marsh at Lagoa de Rodrigo Freitas, Rio de Janeiro, sea-level, n. 198.

Veronia brevifolia Less. Open grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 134.

Mikania stipulacea Willd. Straggler on loose sand near sea, Gavea Beach, near Rio de Janeiro, sea-level, n. 190.

Stifftia chrysantha Mikan. Tree of forest on Morro dos Cabritos, Rio de Janeiro, 1000 ft., n. 194.

Mutisia coccinea St. Hil. In depth of rain-forest, Cantareira, near São Paulo, 3000 ft., n. 114.

M. speciosa Hook. Edge of rain-forest, below Dedo de Deus, Serra dos Orgãos, 3500 ft., n. 159.

Bidens pilosa L. Beside railway-track below Therezopolis, Serra dos Orgãos, 3500 ft., n. 158.

Senecio brasiliensis Less. Edge of rain-forest on Serra below Petropolis, 1500 ft., n. 155.

Baccharis genistelloides Pers. Open hillside at Sant' Anna, São Paulo, 3000 ft., n. 144.

Siphocampylus duploserratus Pohl. Liane of rain-forest at Alto da Serra, between Santos and São Paulo, 2600 ft., n. 154.

S. macropodus (Thunb.) G. Don. Liane of rain-forest at Cantareira, near São Paulo, 3000 ft., n. 115.

Gaultheria Willisiana, sp. nov.

Species a *G. ferruginea* Cham. & Schlecht., cui affinis, ramulis flexuosis porrectis juventute villis carbonaceo-nigris tectis, foliis apice callo nitido præditis, racemis terminalibus tantum, filamentis superne gradatim complanatis distinguenda.

Suffrutex 0·5 m. altus, ramulis flexuosis porrectis rufo-nigris villis carbonaceo-nigris superne tectis. *Folia* elliptica vel rotundata, rarissime subovata, summo apice callo obtuso nigro nitido instructa, basi rotundata vel subcordata, 3–5 cm. longa, 2–3 cm. lata, coriacea, subtus villis compositis rufo-ferrugineis vel purpureo-nigris tecta, pagina superiore demum punctis elevatis subaspera, vestigiis prioris tomenti in nervis primariis persistentibus, nervis lateralibus utrinque 3 obliquis, duobus superioribus ad apicem convergentibus subtus prominulis, reticulato-rugoso-venosa, rete inferiore pagina elevato, margine conspicue sed angustius reflexo minute-serrulato; petioli 3–4 mm. longi, crassi, tomentosi, superne late canaliculati, inferne subteretes. *Racemi* terminales, erecti, bracteati, rufo-ferruginei, dense villosi; bracteæ spatulato-obovatæ, concavæ, summo apice obtusæ, 5 mm. longæ, 4 mm. latæ, subglabræ, ciliatæ; pedicelli 5 mm. longi, bracteolas 2 angustas acuminatas margine serratas rufo-nigro-villosas gerentes. *Calyx* extra dense villosus, tubo intus nudo, lobis subdeltoideis-acuminatis 2·5–3 mm. longis basi 2 mm. latis. *Corolla* 6 mm. longa, extra dense villosa, purpureo-punicea, lobis 1 mm. longis paululum reflexis. *Stamina* 10, 5 longiora 4 mm. longa, filamentis 3 mm. longis tenuibus minute-punctulatis acuminatis complanatis, 5 breviora filamentis 2·5 mm. longis, omnibus antheris 1·5 mm. longis 0·75 mm. latis basi subito acuminatis bilocularibus dorsifixis, quoque loculo apice duas in aristas erectas producto. *Squamæ* hypogynæ 10, connatæ, deltoideæ, subacutæ. *Ovarium* 5-loculare, villis albidis obtectum; stylus glaber, 3 mm. longus. *Semina* quoque in loculo numerosa, punctulis parvis copiose ornata, ambitu truncato-cordata, sectione transversa triquetra.

On open hillside beside River Bengala, near Novo Friburgo, E. Rio Janeiro, 4000 ft., n. 156.

Myrsine umbellata Mart. Tree of campo, Ipanema, E. São Paulo, 2500 ft., n. 150.

Symplocos lanceolata A. DC. Open campo, Georges Oetterer, E. São Paulo, 2500 ft., n. 108.

Macrosiphonia longiflora (Desf.) Müll. Arg. On grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 129.

Asclepias curassavica L. In rain-forest at Cantareira, near São Paulo, in clearings, 3000 ft., n. 112.

Hemipogon setaceus Dne. On grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 153.

Oxypetalum capitatum Mart. & Zucc. On open grassy hillside, Hygienopolis, São Paulo, 2500 ft., n. 135.

Buddleia brasiliensis Jacq. Tree of rain-forest, Cantareira, near São Paulo, 3000 ft., n. 147.

Heliophytum indicum (L.) DC. On marsh at Lagoa de Rodrigo Freitas, Rio de Janeiro, sea-level, n. 203.

Cuscuta racemosa Mart. var. *nuda*, Eng. Parasitic on Rubus bushes, between Therezopolis and Alto da Serra, Serra dos Orgãos, 4000 ft., nn. 164, 241; on Rubus bushes in forest above Gavea Beach, near Rio de Janeiro, 1000 ft., n. 185.

Solanum sisymbriifolium Lam. Small shrub on rocks on hillside, Morro dos Cabritos, Rio de Janeiro, 2000 ft, n. 184.

Herpestes Monniera H. B. K. On salt marsh at Praia do Pinto, Rio de Janeiro, sea-level, n. 187.

Calceolaria scabiosifolia Sims. On pathside, in forest below Dedo de Deus, Serra dos Orgãos, 3500 ft., n. 157. New to Eastern Brazil.

Schwenkia fasciculata Benth. Grassy slopes below bare rock-face near summit of Morro dos Cabritos, Rio de Janeiro, 2000 ft., n. 121.

Lantana Camara L. Liane in rain-forest at Cantareira, near São Paulo, 3000 ft., n. 109.

L. lilacina Desf. Liane on edge of rain-forest, Serra dos Orgãos, near Therezopolis, 4000 ft., n. 166.

Lippia primulina S. M. On open campo, Ipanema, E. São Paulo, 2500 ft., n. 138. New to Eastern Brazil: not in Fl. Brasiliensis.

Hyptis veronicifolia Pohl. On grassy campo, Ipanema, E. São Paulo, 2500 ft., n. 131.

Iresine vermicularis Moq. var. *aggregata* Seubert. Creeper on marsh beside Lagoa de Rodrigo Freitas, Rio de Janeiro, sea-level, n. 186.

I. portulacoides Moq. Creeper on loose sand near sea, Gavea Beach, near Rio de Janeiro, sea-level, n. 188.

Phytolacca decandra L. On open grassy hillside, Morro dos Cabritos, Rio de Janeiro, 1800 ft., n. 195.

Lophogyne arculifera Tul. On rocks in bed of River Bengala, Novo Friburgo, E. Rio Janeiro, 4000 ft., n. 238.

Tristicha hypnoides Tul. On rocks in bed of River Bengala, Novo Friburgo, E. Rio Janeiro, 4000 ft., n. 235.

Artanthe Gaudichaudiana Miq. In rain-forest on Monte Corcovado, Rio de Janeiro, 300 ft., n. 119.

Hedyosmum brasiliense Mart. In rain-forest on Serra above Santos, E. São Paulo, 2600 ft., n. 152. (♂ and ♀.)

Lacistema pubescens Mart. On edge of forest below Vista Chineza, near Rio Janeiro, 1200 ft., n. 199.

Rhopala Gardneri Meisn. Tree of grassy campo near Ipanema, E. São Paulo, 2500 ft., nn. 71, 105.

R. heterophylla Pohl var. *pinnata* Meisn. Tree of rain-forest at Vista Chineza, near Rio de Janeiro, 1000 ft., nn. 72, 74.

Croton Lundianus Müll. Arg. In scrub near stream at Sant' Anna, São Paulo, 3000 ft., n. 140.

Limnocharis Plumieri L. C. Rich. Marshy edge of small stream at its entrance to Lagoa de Rodrigo Freitas, Rio de Janeiro, sea-level, n. 173.

Habenaria parvifolia Lindl. Open hillside, Sant' Anna, São Paulo, 3000 ft., n. 143.

Epidendrum ellipticum Grah. Among rocks on restinga at Ipanema, Rio de Janeiro, sea-level, n. 172.

Prescottia micrantha Lindl. On rocks in gorge near sea, south of Praia de Leblond, Rio de Janeiro, sea-level, n. 174.

P. plantaginea Lindl. Among rocks on restinga at Ipanema, Rio de Janeiro, sea-level, nn. 176, 177.

Canna indica L. In depth of rain-forest at Cantareira, near São Paulo, 3000 ft., n. 111.

Marica nr. *Northiana* Ker. Grassy top of cliff above sea, south of Praia de Leblond, Rio de Janeiro, 70 ft., nn. 170.

Barbacenia purpurea Hook. Clefts in granite rocks near summit, Morro dos Cabritos, Rio de Janeiro, 2000 ft., nn. 122, 192.

Amaryllis rutila Ker. Grassy top of cliff close to sea, Praia de Leblond, Rio de Janeiro, 50 ft., n. 171.

Tradescantia fluminensis Vell. Edge of forest on paths, Serra dos Orgãos, Therezopolis, 4000 ft., n. 160.

Eriocaulon vaginatum Körnicke. In marsh at Sant' Anna, São Paulo, 3000 ft., n. 116.

Calyptostylis florida N. ab E. In rain-forest on Serra dos Orgãos, Therezopolis, 4000 ft., n. 163.

Pleurostachys Geraldiana, sp. nov.

Species a *P. Sellowii* Kunth, cui affinis, vagina sinuato-truncata nondum mucrone instructa, inflorescentiæ ramis haud approximatis distinguenda.

Culmus foliosus, 1–1·5 m. altus, triangularis, glaber, foliis tristichis. *Folia* linearia, anguste acuminata, vagina glabra caulem amplectante ore ad latus folio oppositum sinuato-truncato margine ciliato nondum mucrone instructo, 25–35 cm. longa, 5–7 mm. lata, chartacea, pagina utraque plana nisi medio inferiore carinata superiore vix prominulis, margine reflexo scabrido.

Inflorescentiæ 10, axillares et terminales, ramosæ inferiores 5–10 cm. superiores 1–2 cm. distantes; pedunculi plerumque 9, ramosi, 1–3 mm. distantes, oblique patentes, 1–3 cm. longi, basi bracteis anguste acuminatis 8 mm. longis ciliolatis, vaginis scariosis instructi, et bracteis et vaginis basi gibbosis, apice spiculas 3–10 conglomeratas, gerentes. *Spiculæ* obovoideæ, obtusæ, 1–5 mm. longæ, 1 mm. diametro, bracteolis 5 scarioso-membranaceis spatulatis demum bifidis. *Flores* bisexuales, setis hypogynis quatuor 1 mm. longis brunneo-ciliatis, staminibus 3, filamentis persistentibus setis vix longioribus, ovario ambitu ovato complanato 1 mm. longo, stylo bifido, ramis 1 mm. longis, divergentibus curvatis primoque nondum arcuato-erectis, stigmatibus 0·5 mm. longis, demum deciduis.

On edge of rain-forest at Cantareira, near São Paulo, 3000 ft., n. 151.

Aneimia flexuosa (Sav.) Sw. (n. 211) *A. mandioccana* Raddi (n. 210) and *A. radicans* Raddi (n. 212). Roadside near Alto da Boa Vista, near Rio de Janeiro, 2000 ft.

Lygodium circinnatum (Burm.) Sw. Roadside at Gavea, near Rio de Janeiro, 100 ft., n. 216.

Osmunda regalis L. In marsh at Hygienopolis, São Paulo, 2500 ft., n. 218.

Gleichenia furcata (L.) Spr. Among scrub on hillside, Hygienopolis, São Paulo, 2500 ft., n. 217.

Hymenophyllum caudiculatum Mart. (n. 208) and *H. polyanthos* Sw. (n. 209). Side of waterfall at Alto da Boa Vista, near Rio de Janeiro, 2000 ft.

Aspidium martinicensis Spr. In depth of rain-forest on Monte Corcovado, Rio de Janeiro, 1500 ft., n. 17; and on road to Vista Chineza, near Rio de Janeiro, 1000 ft., n. 21.

A. trifoliatum (L.) Sw. In rain-forest on Monte Corcovado, Rio de Janeiro, 1500 ft., nn. 22, 133.

Dryopteris grandis (Pr.) C. Chr. On edge of road through rain-forest at Vista Chineza, near Rio de Janeiro, 1000 ft., n. 20.

D. vivipara (Raddi) C. Chr. In depth of rain-forest on Monte Corcovado, Rio de Janeiro, 1500 ft.. n. 23; in rain-forest below Vista Chineza, near Rio de Janeiro, 1000 ft., nn. 12, 125.

Polystichum adiantiforme (Forst.) J. Sm. On open hillside above sea, south of Praia de Leblond, Rio de Janeiro, 100 ft., n. 15; on loose sand close to sea, Gavea Beach, near Rio de Janeiro, sea-level, no. 223.

Polypodium brasiliensis Poir. On loase sand, Gavea Beach, near

Rio de Janeiro, sea-level, n. 9; on rocks in gorge south of Praia de Leblond, Rio de Janeiro, sea-level, n. 14; in depth of rain-forest below Vista Chineza, near Rio de Janeiro, 300 ft., n. 10.

P. Catharinæ Langsd. & Fisch. Below trees on restinga, Praia de Leblond, Rio de Janeiro, sea-level, n. 11.

P. cultratum Willd. Beside small stream in dripping rain-forest, Alto da Serra, E. São Paulo, 2600 ft., nn. 3, 132.

P. decurrens Raddi (n. 19) and *P. loriceum* L. (n. 16). In depth of rain-forest on Monte Corcovado, Rio de Janeiro, 1500 ft.

P. fraxinifolium Jacq. In depth of rain-forest at Alto da Serra, E. São Paulo, 2600 ft., n. 4.

P. lepidopteris (Langsd. & Fisch.) Kze. On rocks in clearing through forest, Serra dos Orgãos, below Therezopolis, 3500 ft., n. 7.

P. plumula H. B. Willd. On walls, Serra below Petropolis, 2000 ft., n. 5; on walls, Serra dos Orgãos, Therezopolis, 4000 ft., no. 6.

P. polypodioides (L.) Hitchcock. On bases of Royal Palms (*Oreodoxa oleracea* Mart.) in Jardim Botanico, Rio de Janeiro, n. 13.

P. serrulatum (Sw.) Mett. On rocks in bed of stream, Alto da Boa Vista, near Rio de Janeiro, 2000 ft., n. 206; on clay in bed of stream in rain-forest, Alto da Serra, E. São Paulo, 2600 ft., n. 8.

Leptochilus guianensis (Aublet) C. Chr. Climber on tree in rain-forest below Vista Chineza, near Rio de Janeiro, 1000 ft., n. 213.

Adiantopsis radiata (L.) Fée. In rain-forest, beside aqueduct from Paineiras, Monte Corcovado, Rio de Janeiro, 1500 ft., n. 215.

Lycopodium repens Sw. (nn. 204, 242) and *L. cernuum* L. (n. 205). On banks by roadside in forest, Alto da Boa Vista, near Rio de Janeiro, 1500 ft.

L. clavatum L. In rain-forest at Alto da Serra, E. São Paulo, 2600 ft., n. 219; on débris in cutting at Meio da Serra, below Petropolis, 1500 ft., n. 221.

L. complanatum L. On unshaded bank by roadside, Cantareira, near São Paulo, 3000 ft., n. 222.

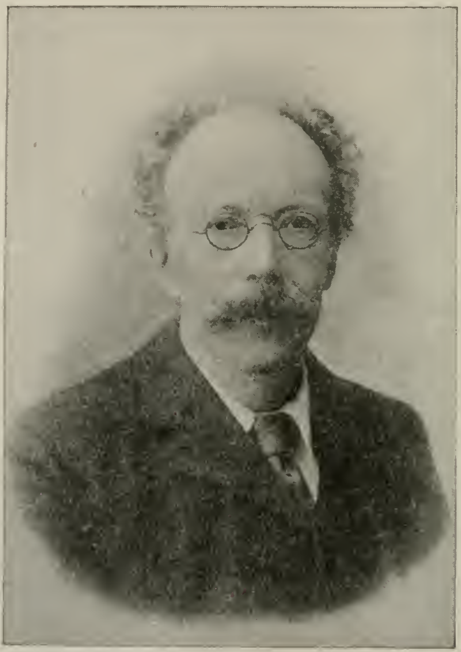
L. paradoxum Mart. Creeping in marsh at Sant' Anna, São Paulo, 3000 ft., n. 220.

Azolla caroliniana Willd. On margin of Lagoa de Rodrigo Freitas, Rio de Janeiro, sea-level, n. 245.

GEORGE EDWARD MASSEE.

(1850–1917.)

George Edward Massee, who ranks with Berkeley and Cooke as one of the makers of British mycology, died at Sevenoaks on February 16th, succumbing to an attack of influenza, and was buried at Richmond, Surrey. He was born at Scampston, a hamlet in East Yorkshire, on December 20th, 1850, and educated at a private school. It was intended that he should follow the occupation of his father and become a farmer, and it was while helping on the farm that he became interested in wild flowers and in the larger fungi, and drew and painted them. But, according to his own statement, he did very little good at farming, so he was sent to the York School of Art, where he gained the national medal for the drawing of flowers from nature. His first paper (on British Woodpeckers) appeared in the *Intellectual Observer* for 1867; it was illustrated by a coloured plate, both plate and paper being admirable work for a youth of seventeen. His mother's cousin was Dr. Richard Spruce,* the botanist and traveller, who encouraged him in the botanical studies which occupied his spare time. Later he went into residence at Downing College, but he did not stay long at Cambridge, possibly because Spruce was able to give him the opportunity of going to the West Indies and South America for the purpose of orchid-hunting and botanizing generally.



Before he was out of his teens Massee crossed to America on a French boat, traversed the Panama isthmus and then sailed along the coast to Quito. Here he struck inland and made his way up the Naps, collecting orchids, fungi, and ferns—he sent home in bulk *Oncidium macranthum* and *Nanodes Medusæ.* His only white companion was a Dr. Brown, picked up by chance on the way: the others were Indians hired from the Catholic missionaries, who seemed to have extraordinary power over the inhabitants of the scattered villages. On one occasion Massee was ill for three weeks in an Indian hut with dysentery, unconscious most of the time and nursed by an old squaw. Hundreds of miles of mule-riding gave Massee a rather philosophical idea of a mule's characteristics, and, in later years, the sight of one of these animals called up reminiscences of perilous paths and of a wise cautious animal sometimes moved to indiscretions by the persuasion of a wisp of lighted straw attached to its tail. While in the forest he lived on rice meal and an occasional monkey—an experience which cured him of any enthusiasms concerning the "simple life," which he regarded as being quite reasonable except when one has to hunt for one's breakfast at supper-time. The Indians persuaded him to go bare-foot and he was afterwards very reluctant to return to boots. One of his remarks about the Indians was that they were so lazy that they would spend an hour catching one of their half-wild horses in order to ride a few yards. Amongst his experiences in South America were earthquakes and a narrow escape from a puma, which sprang upon him from the overhanging branch of a tree.

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* Most of the plates in Spruce's *Hepaticæ of the Amazon* (1885) were drawn by Massee.

Returning home on a French boat Massee joined the Foreign Legion—the Franco-Prussian War was then in progress. He transferred to the 4th Chasseurs—he had the name tatooed on his arm,—but he saw little or no fighting, as the big engagements were already over. His mother, being alarmed, got in touch with the authorities and had him sent home, where she prevailed upon him to remain on the farm with his father—he was an only son. Here he continued his botanical studies, specializing on fungi and plant diseases. When, some years after his return, his fathor died, Massee and his mother removed to Scarborough, where he taught botany in various schools and studied geology, which he nearly adopted as a career, only withdrawing at the last moment from a post which was offered to him. He worked hard at the fungus flora of the Scarborough district and painted a considerable number of agaries, many of the drawings being afterwards used by Cooke in his *Illustrations*. His first paper on fungi was "Notes on some smaller Fungi" in *Science Gossip* for 1880; this included Myxomycetes.

In the early eighties Massee removed to London and later to Kew. At this period he lectured at various institutions on various biological subjects. He also did a large amount of University Extension lecturing; some of the lectures were afterwards arranged in book-form with the title *Evolution in Plant Life*. Papers on fungi now began to appear with great rapidity. He worked principally in the Kew Herbarium as a free lance, where he received great assistance from M. C. Cooke, who had formed a good opinion of his work when Massee was working alone at Scarborough.

In 1871 Massee published an account of the British Phycomycetes and Ustilagineæ under the title *British Fungi*. Although much praised by certain mycologists at the time, it cannot be said to be a book of much value, even for the period; but it is still the only book dealing with British Phycomycetes. The following year his *Monograph of the Myxogastres* appeared, but this was almost immediately eclipsed by the splendid Lister Monograph; and at the same date the first volume of his *British Fungus Flora*. The arrangement of this is very bizarre, but the work was and is much used, and is on the whole an excellent production; the last volume did not appear until 1895. Unfortunately through faulty arrangement the whole of the flora was not treated; the Basidiomycetes occupied much more than half the volumes, the Discomycetes one volume; the Hyphomycetes received rather scanty treatment. This was the last attempt to write a complete British Fungus Flora.

About the year 1892 Massee worked for some time in the Botanical Department of the British Museum, which acquired from him his valuable series of original fungus paintings. He was employed principally in preparing the exhibition stands of microfungi in the general gallery, a work which was afterwards completed (and almost entirely done) by Miss Lorrain Smith. Batters was working in the Department at the time and he and Massee acquired the quarterly publication *Grevillea* which Cooke had managed for the previous twenty years. Massee acted as editor from 1892 to 1894 (vols. xxi., xxii.), after which it ceased to appear.

When Cooke retired from Kew, Massee was appointed Principal Assistant for Cryptogams. He now applied himself more thoroughly to the study of plant diseases and in 1899 published his most successful book—a *Text Book of Plant Diseases*,—which ran through three editions and was replaced in 1910 by his more ambitious *Diseases of Cultivated Plants and Trees.* His practical experience of farming helped him greatly in understanding the conditions under which diseases are most likely to cause losses, but many of the ideas expressed in the later book are not generally accepted. He produced a very useful book—*European Fungus Flora: Agaricaceæ*—in 1902, and in 1905 collaborated with the late Charles Crossland in the *Fungus Flora of Yorkshire.* He attended the annual forays of the Yorkshire Naturalists' Union for many years: it was through his enthusiasm and hard work that the Mycological Committee, of which he was chairman, came into existence. The British Mycological Society was formed at the Halifax meeting in 1896 and Massee was elected as first president; the large number of records in the flora for the Scarborough district indicate the extent of his collecting.

In 1906 appeared his *Text Book of Fungi*—a work which, though somewhat scrappy, contains much valuable information. His *British Fungi and Lichens* (illustrated by his daughter Ivy, to whom I am indebted for many of the facts contained in this notice), which appeared in 1911, is a remarkably cheap and useful work: the title is misleading, as lichens are merely mentioned. His last book, *Mildews, Rusts and Insects*, written in collaboration with his daughter, did not add to his reputation. He wrote in all about two hundred and fifty articles on fungi.

Massee had a world-wide reputation as a mycologist. During the years he studied the various groups he had acquired a knowledge of fungi practically unrivalled. But though brilliant he was often careless; if he had had any capacity for taking pains he would have been a genius. He had a clear mind, and was regardless of authority: the latter trait he carried to excess and often totally disregarded results which would have prevented his making rather startling mistakes. This was perhaps the result of his training and of his period. He began his study when Berkeley was *the* authority: Cooke followed Berkeley and on Cooke's retirement the mantle naturally fell upon Massee. But times had changed, and though his opinion in the naming of species received the consideration due to his extensive knowledge it was neglected when he attempted to criticize—or even ridicule—branches of the subject with which he had not first-hand acquaintance. His cynicism often led him to say, and even to do, things which were much resented; but his experiences with some of the younger school who called themselves mycologists and yet professed to despise "species" probably had much to do with his sharpness of tongue—I, personally, always found him very kind and pleasant. He was well liked by the gardeners at Kew, to whom he lectured on plant pathology; his knowledge of the practical side of their work, his wide interests, his wit and his virility even to the end, impressed them to an extraordinary degree. For many years Massee was the recognized leader of the fungus forays around London. His knowledge of the fungi of Epping Forest and of Kew Gardens was unrivalled: of the latter he published an account in the *Kew Bulletin* for 1897 (pp. 115–67) which was subsequently extended in the Additional Series (v) of the *Bulletin*, to which further additions were subsequently made. On resigning his Fellowship of the Linnean Society in 1915 he was immediately elected an Associate.

JOHN RAMSBOTTOM.

[For the use of the portrait accompanying this notice we are indebted to the Editor of the *Garden*.]

SHORT NOTE.

VIOLA LACTEA Sm. NEAR BRISTOL. This ericetal rarity has had no local record hitherto and is very scarce throughout the West of England. In my account of the Violets of this district (*Fl. Brist.* p. 177) I mention the occurrence of *V. canina* L. var. *lanceolata* Mart.-Don. on Yate Lower Common, West Glouc. As may be seen in *British Violets* Mrs. Gregory, while assenting to the name, saw that the plant differed from Oxfordshire specimens of the variety; and she owned in correspondence that had *V. lactea* been known in the vicinity she would have strongly suspected our plant to be, preferably, a hybrid—*canina* × *lactea*. As opportunity offered, therefore, we searched the locality repeatedly for *V. lactea*, and were at length rewarded by finding two small plants of it at a short distance. Later, Miss Roper detected it in very small quantity on another part of the Common, and on June 4, in an enclosure nearly a mile from the original station, I was glad to see amongst coarse heathy herbage a number of tufts (of course past flowering) over a space of 50 or 60 yards. It seems now fairly certain that the so-called *lanceolata* is indeed the hybrid suggested by Mrs. Gregory, and subscribers to my book are invited to make the necessary correction and addition in their copies. The hybrid *canina* × *Riviniana* is also present at the spot first above mentioned, but *canina* itself is decidedly rare in that neighbourhood. The tract known as Yate Lower Common and lands adjacent were originally portions of the ancient Royal Forest of Kingswood and were enclosed at the beginning of the last century. In a few spots here and there the old ericetal vegetation still survives. In others the ground is pitted with excavations from which pockets of strontium ore (celestine) have been extracted. Many of these have become ponds as well as some larger and older pits, the result of clay or marl digging in former days. Thus, while botanically productive, the Common is interesting from other points of view.—Jas. W. White.

REVIEWS.

Botanical Names of the Wild Flowers. What they mean. How Pronounced. By Colonel J. S. F. Mackenzie. Pp. ix, 228. London: Holden and Hardingham. 8*d*. net.

The compiler of this neat well-printed and astonishingly cheaply little book is of opinion that many are "prevented trying to learn the names of the wild flowers because of the uncouth look of their botanical names"; he apparently thinks that this appearance would be modified if folk knew their meaning, and sets to work to explain them. Unfortunately, however, the idea is better than its execution, and we fear the well-intentioned little volume will tend to perpetuate existing errors as to derivations, while it will certainly promulgate many new ones. Some of these latter are as ingenious as they are inaccurate: a striking example is *Mielichoferi*, which the Colonel writes "Mielchoferi" and proceeds to derive from the "Greek, mielcho (honey); Latin, feri (bearer); The very numerous misprints often render the meaning unintelligible: the very first entry affords material for criticism, and indicates the style of the book; it runs: "*Abele* (a-be-le). Polish. 'Bialo' (white) a name for the White Poplar." The name is not trisyllabic (cfr. Mrs. Browning's reference to "six abeles"); it is not Polish, but Dutch; "bialo" would seem to be a misprint for "bianco"—the tree is called "pioppio bianco" in Italy. Nor is Colonel Mackenzie happier with English names (the inclusion of which is not indicated by the title of the book): London Pride certainly does not "get its name from the firm of London and Wise, who introduced the plant in the early 18th century," as the name was in common use in 1697, and the plant was in general cultivation when Gerard wrote his Herbal (1597)—see Journ. Bot. 1895, 422. The terminology is as original as are some of the derivations: Colonel Mackenzie uses "group" throughout for genus, and the word species is entirely ignored in favour of "second botanical name."

It would be easy to criticize the little volume at greater length, but the above indication of its contents will, we think, prove sufficient. There is, we fancy, room for such a book, although Randal Alcock's scholarly *Botanical Names for English Readers*, issued forty years ago (with which Col. Mackenzie does not seem to be acquainted) is still in print. Should a second edition of the work under notice be called for, the compiler would do well to submit the proofs to a botanist for correction.

Theophrastus Enquiry into Plants and Minor Works on Odours and Weather-Signs with an English Translation by SIR ARTHUR HORT, Bart., M.A., formerly Fellow of Trinity College, Cambridge. London: William Heinemann: MCMXVI. In two volumes, cloth, fcap. 8vo, pp. xxviii, 475, ix. 499. Price *5s.* net each.

THESE two volumes are recent additions to the Loeb Classical Library of translations, a series in which the original and the English version occupy opposite pages. The volumes are attractive in every respect: the binding, type, and paper are excellent, and the price is reasonably cheap. The majority of the books included in the series are more or less familiar in translation; but it has been left to Sir Arthur Hort to present for the first time the works of Theophrastus in English. He expresses a modest doubt whether his work will be found "entirely satisfactory," as he "is not, as he should be, a botanist"; but any deficiencies on this head are supplied by Sir William Thiselton-Dyer, Prof. D'Arcy Thompson, Mr. A. W. Hill and others. To the first-named Sir Arthur is indebted for the identifications in the very full and scholarly index, which occupies nearly fifty pages in double columns and small type, and is indeed an epitome of the information contained in the work concerning each plant: a key to this contains a list of plants mentioned under botanical Latin names and another of those having popular English names, the Greek equivalent being supplied in each case. There is an admirable bibliographical and biographical introduction, and a portrait of Theophrastus from the bust in the Villa Albani. Of the *Enquiry* itself, every page is annotated—nothing in fact has been overlooked which can add to the completeness of the volumes, and the author's "hope that this translation may assist some competent scholar-botanist to produce an edition worthy of the author" is really fulfilled by his own undertaking.

The translator points out that Theophrastus (B.C. 370–285) was the first to apply the principle of classification to the vegetable world; the first book begins by discussing "how plants are to be classified," and the subject is of constant recurrence. "Throughout his botanical works the constant implied question is 'What is the difference?' 'What is its essential nature?' viz. What are the characteristic features in virtue of which a plant may be distinguished from other plants, and which make up its own 'nature' or essential character?" It was doubtless in the garden in the grounds of the Lyceum bequeathed to him by Aristotle, whose favourite pupil he was, "that the first systematic botanist made many of the observations which are recorded in his botanical works." In his will Theophrastus "made provision for the maintenance of the garden; it is bequeathed to certain specified friends and to those who will spend their time with them in learning and philosophy; the testator is to be buried in it without extravagant expense, a custodian is appointed, and provision is made for the emancipation of various gardeners, so soon as they have earned their freedom by long enough service."

The nine books deal respectively with the parts of plants and with classification; with propagation, especially of trees; with wild trees; with the trees and plants of particular districts; with timber; with under-shrubs; with herbaceous plants; with cereals; and with the medicinal properties of herbs: in this last a chapter is devoted to the medicinal herbs peculiar to Crete. Appended to the Enquiry are two Treatises dealing respectively with Odours and Weather-Signs, many of the latter corresponding with those accepted among ourselves. The Enquiry forms a valuable pendant to the work of Aristotle, so far as plants are concerned, and English readers will be grateful to Sir Arthur Hort for rendering it accessible to them in their own language.

BOOK-NOTES, NEWS, ETC.

In *Somerset and Dorset Notes and Queries* for March last Mr. H. Downes prints the following note on a volume which he recently discovered in a general dealer's shop in Taunton, "the chief interest of which lies in the fact that it originally formed a part of the library of Henry Lyte, and contains his signature and some manuscript notes in his writing. The book in question consists of two works bound together, viz., *Alexikerus, seu Auxiliaris Hortus* etc., and *Nova et Mira Artificia*, etc., . . . 'autore Antonio Mizaldo, Monluciano, Medico. Lutetiae, 1564.' Mizauld was a well-known French physician (1520–1578), who wrote many books, of which the *Alexikerus* is one of the earliest. At the top of the title-page of *Alexikerus*, in red ink, is the signature 'Henry Lyte,' and across the printer's device (a mulberry tree) on the same page is 'Henry Lyte, 1565.' The signature is repeated on the title-page of the second work. A few trifling marginal notes are scattered through the volume, and many passages are underlined, the notes and underscorings, as well as the signatures, being in red ink. At the end of the volume are two pages of manuscript notes, mostly medical definitions or short descriptions of diseases. A list of Mizauld's works is printed at the end of the volume, and several of these are marked 'H' (Habeo?), which seems to show that Lyte possessed them. All the above are in Lyte's handwriting . . . . A long and valuable article on the Lyte Family, by Sir H. C. Maxwell-Lyte, is to be found in the *Transactions of the Somerset Archæological Society*, vol. xxxviii., where a facsimile reproduction of Henry Lyte's signature has enabled the present writer to authenticate the handwriting in the volume under consideration. Reference is also made to Lyte's habit of using both red and black ink in his annotations. Sir H. Maxwell-Lyte informs the writer that it is not known when or how Henry Lyte's library was dispersed. It is probable that this volume has been lying in Somerset ever since he acquired it." A facsimile of the title-page accompanies the note, which is followed by a transcription of the MS. medical definitions.

The *New Phytologist* for May and June (published June 28) contains a note on the distribution of sexes in *Myrica Gale*, by A. J. Davey, B.Sc., and C. M. Gibson, B.Sc., based on observations during several successive years on a large area of the plant in the peat-moors of Somerset. In the same number Mr. H. S. Thompson calls attention to the similarity of the radical leaves of *Valeriana dioica* and *Parnassia palustris*.

Mr. A. H. Evans prints in the *History of the Berwickshire Naturalists' Club* (xxiii. 217–235) some notes on plants found in the district worked by the Club: the notes are supplementary to the list of less common plants of the same area printed by Mr. Adam Anderson in the preceding volume (xxii. 227 *seqq.*), and are largely based on the writer's own observations.

Messrs. Routledge have published (1*s.* 6*d.* net) a curious little book on *The Wild Foods of Great Britain*, "where to find them and how to cook them," by L. C. R. Cameron. Of this about half is devoted to the vegetable kingdom, beginning with "Wild Vegetables, Herbs, and Salad-Plants," and passing through "Edible Flowers and Wild Fruits" to "Esculent Seaweeds" and "Edible Funguses." The first on the list is *Papaver Rhœas*, of which "the young leaves from plants that have not flowered should be gathered during harvest-time," and are used for making salads" or "may be cooked like spinach:" even those who have noted the very various contents of an Italian salad would, we think, be surprised to find poppy-leaves among them. Among "Edible Flowers" the Lime holds the first place: the Fungi are treated at considerable length. There are numerous illustrations, mostly poor reproductions of well-known figures. "Over thirty years' experimental experience"—manifestly the best kind of experience—"enables [the author] to recommend with confidence all the recipes included in this book," some of which, he tells us, echoing the White Knight, "are of my own invention." The book is "cordially recommended" (by the author) "to the very poor, chiefly men of letters and disabled officers discharged without pension or gratuity—a large and growing class—in the hope that by its means they may be enabled to provide themselves with good and palatable food that might otherwise prove beyond their reach."

It will be remembered that Mr. E. C. Horrell's *European Sphagnaceæ* was published as a Supplement to this Journal in 1901 and contained descriptions of all the species varieties recognised at that time as European. The diagnoses were translated and adapted from Warnstorf's publications in *Hedwigia* and elsewhere. In 1911 Warnstorf published his weighty and definitive monograph, the *Sphagnologia Universalis*, the outcome of his life's work on the Sphagnaceæ of the whole world: but the price of that work and the German text have made it inaccessible to most British moss-students. We are now indebted to Mr. J. A. Wheldon for a *Synopsis of the European Sphagna* (Darwen: W. H. Western, June 1917, 42 pp., price 2*s.* 6*d.*), which is compiled from Warnstorf's *Sphagnologia* and indicates the species varieties and forms that occur and are likely to occur in the British Isles, giving brief diagnoses of all such as were not described in Mr. Horrell's work. Fifty-nine species and innumerable varieties and forms are included, as against Mr. Horrell's fifty species and hundred and fifty varieties; and brief key characters are supplied in some of the groups, especially Cuspidata and Subsecunda. The classification is more elaborate, in keeping with the advanced development of Warnstorf's later views. Further, a few new forms not included in Warnstorf's *Sphagnologia* have been discovered in our islands; and some of these are now described in rather inadequate Latin. Mr. Wheldon's *Synopsis* was compiled with a view to the needs of the Moss Exchange Club, from whose Hon. Sec. Mr. Wm. Ingham, 6 Sycamore Terrace, Clifton, York, copies may be obtained. It may be of interest to add that *The Twenty-second Annual Report* (York: Coultas & Volans, Ltd., 1917, pp. 177–199) of this Club has recently come to hand, and contains the customary list of mosses and hepatics contributed by the members. Some of the items are illuminated with valuable remarks and criticisms by the referees.

A. G.

We are glad to learn that the numerous protests which have been raised in connection with the proposed suspension of the *Kew Bulletin* have been effectual. The official decision regarding it was made public in the House of Commons on the 4th ult., when Mr. S. Baldwin, replying to a question addressed to the Treasury, said:—"I am informed that the question of the suspension of the issue of the Kew Bulletin was considered by the Select Committee on Publication and Debates Reports last week, and that it was decided to recommend that the Bulletin should be continued, but with due regard to economy. Subject to the omission, therefore, of certain classes of information which, though doubtless of scientific interest can, it is thought, be postponed without detriment to the welfare of the State, the publication of the Bulletin will be resumed." This statement did not make it clear whether the classes of information to be left out were to be omitted by the Editor or to be cut out by the Select Committee on Publication and Debates Reports, and on July 10 Viscount Bryce opened a debate in the House of Lords on this matter. In reply to Lord Bryce, the Duke of Marlborough, on behalf of the Government, said that:—"The Editor will be allowed to decide the matter of the Bulletin and will consider what is essential and what can properly be omitted." The second number of the Bulletin for the current year will be issued immediately, and will be followed by other numbers as rapidly as possible.

The June number of the *Journal of Ecology* contains continuations of the papers on "The Salt Marshes of the Dovey Estuary," North Wales, by R. H. Yapp, D. Johns, and O. T. Jones and "On the Ecology of the Vegetation of Breckland," Suffolk, by E. Pickworth Farrow. Both papers are illustrated with plates and figures in the text.

BRITISH PULMONARIAS.

By A. J. Wilmott, F.L.S.

The genus *Pulmonaria* has not recently attracted much attention in this country. The latest monograph of the genus, Kerner's *Monographia Pulmonariarum*, appeared as long ago as 1878, yet it does not appear to have been studied by British botanists. Kerner places the Hampshire plant under his first species "*P. angustifolia* Linn. Fl. suec.," which is his name for the plant often called *P. azurea* Besser. I hope to show that it is certainly not that very distinct species, but is the plant which Kerner calls *P. longifolia*.

The history of the British plant is interesting. The first record is by Parkinson (Parad. 248: 1629), who observes "The Cowslips of Jerusalem grow naturally in the woods of Germany, in divers places, and the first kind in England also, found out by John Goodier, a great searcher and lover of plants, dwelling at Mapledurham in Hampshire." Parkinson's "first kinde" is from the description clearly *P. officinalis*.

Goodyer's find is dealt with four years later by Johnson in his edition of Gerard's *Herball*. Johnson says (p. 809), "Mr. Goodyer found the *Pulmonaria foliis Echii*, being the second, May 25, *anno* 1620 flouring in a wood by Holbury house in the New Forest in Hampshire." The figure given of this *Pulmonaria foliis Echii* is *P. officinalis*, while that of *P. maculosa* is apparently *P. saccharata*, Reference to the original edition of Gerard shows that the figures of these are incorrectly interchanged in the later work." Indeed, the figure of *P. maculosa* is line for line identical with Lobel's figure of *P. foliis Echii* (*Kruydtboeck*, 692: 1581).

Gerard's description of his *P. foliis Echii* is of the plant represented in his figure of *P. maculosa*. "The second kinde of Lungwort is like unto the former, but greater in each respect; the leaves bigger than the former, resembling wilde Buglosse, yet spotted with white spots like the former; the floures are like the other, but of an exceeding shining red colour." This colour is not that of the British plant, but agrees, I believe (I have not myself seen the plant alive), with that of *P. saccharata* Mill., Kerner (Mon. Pulm. 17. t. 7) = *P. picta* Rouy (Fl. Fr. x. 297: 1908). This plant was originally spread from Belgian gardens, where Lobel saw it. There are specimens of it in Herb. Sloane, together with others which I hope to deal with in a later article on *P. saccharata* Mill.:—

1.—Vol. 47. f. 49, a volume of "plants known about the year 1660": the collector of these garden plants is not known.

2.—Vol. 83. p. 15 as *P. fol. Echii* Lob. ic. . . . . (Plukenet's European Plants).

3.—Vol. 121. p. 6 as *P. fol. Echii* Ger. em. (Buddle, Herb. Plant. Britann.).

There is no locality nor date to the specimen of *P. saccharata*, but it must have been in the country in his time, and was evidently the plant understood by contemporary botanists as *P. foliis Echii*. The British plant is thus identified in all the editions of Ray's

Synopsis. I have not traced any specimens collected by Goodyer. Since *P. longifolia* now occurs in so many places in the New Forest, it is to be inferred that it was the species which Goodyer found, otherwise it would be possible to suppose that it was *P. saccharata*, perhaps escaped from Holbury House.

When binominalist authors are consulted, confusion is seen to have been caused by their reference to Parkinson. Hudson (Fl. Angl. 67 : 1762) refers to Goodyer's plant as *P. officinalis*, citing in ed. 2 Fl. Dan. t. 482, which is true *P. officinalis.* Stokes in Withering (*Bot. Arr.* ed. 2. i. 193–4 : 1787) deals with the conflicting accounts and makes a more correct identification, in accordance with Ray etc. Under *P. officinalis* he says : "Given on the authority of Mr. Hudson, who refers to *Fl. dan.* 482, the *P. officinalis* and also to *Ger. em.* 808. 2, *R. syn.* 226 which is the *P. angustifolia*, and gives no place of growth except the one transcribed from Ray." Under *P. angustifolia* is cited "*Fl. dan.* 483.—*Ger.* 662. 2.—*Clus.* ii. 170. 1. *rep. in Ger. em.* 808. 2, ... 'Mr. Goodyer found it in a wood by Holbury House in the New Forest, Hampshire.' Johnson in Ger. em. 809 . . . . . The authority of Mr. Goodyer is cited also by Parkinson, but who supposes him to have found the *P. officinalis.*"

Hull (Brit. Flora, 47 : 1799) follows Stokes, but Smith (Fl. Brit. 1. 217 : 1800) refers Goodyer's plant to *P. officinalis*, together with Abbot's record of *P. officinalis* for Bedfordshire and Robson's for Darlington.

Smith further remarks "*Pulmonaria angustifolia* Britanniae dubia civis est. Folium e Wallia, ab amicissimo D. Robson missum, ad *Symphytum tuberosum* potius pertinere olim mihi visum est." Smith's reference to Robson may be explained by reference to Withering (ed. 3. ii. 228 : 1796), where we read :—"Mr. Robson informs me that he had a specimen sent him in the year 1783, by the late Mr. Waring, of Leescrood, Flintsh., who found it [*P. angustifolia*] growing wild on the ruins of the Monastery Maes Glas" (see Phil. Trans. lxi. 378 : 1772). In ed. iv. (ii. 224 : 1801) is added :—"but Mr. Griffith says Mr. Waring's specimen proves to be the *Anchusa sempervirens*" (see also Bot. Guide, 292 : 1805). After the rediscovery of *Pulmonaria*, Smith (E. B. 1628) states "we are now satisfied of its being what Mr. Waring sent Mr. Robson from Flintshire." The leaf is not in Smith's herbarium, only Robson's letter which contained a request that the leaf should be returned. Doubtless Griffith's determination is correct.

In 1804 Griffith discovered a *Pulmonaria* in the Isle of Wight, between Newport and Ryde : this was figured in *English Botany* (t. 1628), published Aug. 1, 1806, from specimens collected by Borrer and Dawson Turner on June 3 of that year. Bromfield (Fl. Vect. 323 : 1856) gives a good description, noticing that the leaves vary in breadth a good deal, and making a var. "β leaves linear-lanceolate" with "*P. azurea* Besser" as a synonym. This appears to be the first mention of *P. azurea* as an English plant. The previous identification was merely as *P. angustifolia* L. which probably included various narrow-leaved Pulmonarias. The identification by Smith in *English Botany*, as previously by Stokes, was with Fl. Dan. t. 483. This plate is certainly not *P. azurea*, but appears to be *P. tuberosa* in Kerner's sense, although neither Denmark nor Norway is cited by him in the distribution of that species. Is it possible that garden specimens may have been figured, although the text states "mixed with the preceding [*P. officinalis* . . . common in woods] but rather rarer"?

Syme (Eng. Bot. vii. 91: 1867) goes a stage further. He names the whole "*P. angustifolia* Linn. Wahl."—*i. e.* meaning the same as Kerner indicated by "Linn. fl. suec.,"—and cites *P. azurea* Besser, Koch, Reichb.. and DC. as synonymous. But he confuses the matter by quoting Billot exsicc. 1277. This number is called *P. tuberosa* (from La Manche) part being correctly named, the remainder (from Vendée) being the British species. It is *P. longifolia* and is cited as such by Kerner: Billot 1277 ter. and quater. are both *P. tuberosa*. Townsend (Fl. Hampshire, ed. 1. 264: 1883; and ed. 2. 317: 1904) makes no attempt to identify the plant critically: he cites both *P. azurea* Besser and *P. tuberosa* Schrank as synonyms of his *P. angustifolia*. F. N. Williams (Prodr. Fl. Brit. 1. 251: 1909), however, names it unambiguously *P. azurea*, although he was acquainted with Kerner's monograph.

Since Kerner's monograph is uncommon, his diagnoses of the species are translated here (italics mine):

1 [p. 3]. P. ANGUSTIFOLIA Linn. Fl. Suec.—*Leaves unspotted, radical ones linear lanceolate* or *oblong lanceolate*, about 8 times longer than broad, when mature exceeding the collateral fruiting stem, upper surface strigose with equilong setæ [N.B. occasional glands occur], *cauline ones erect 8–9 times longer than broad*, uppermost slightly decurrent into the stem on both sides; upper part of stem and branches of inflorescence with numerous subequal setæ, with a very few sharply stipitate glands intermixed. Inflorescence augmented and lax at the end of flowering. Calyx segments porrect and accumbent at the apex, exceeding the throat of the corolla. Fruiting calyx campanulate-cylindrical, not ventricose inflated. *Limb of* unfolded *corolla campanulate, azure. Tube glabrous* below the ring of hairs in the throat.

2 [p. 9]. P. TUBEROSA Schrank.—*Leaves unspotted, radical ones* oblong lanceolate [N.B. *elliptical* is my term for them], 4–5 times longer than broad, when mature exceeding the collateral fruiting stem, upper surface strigose with unequal setæ, with some stipitate glands intermixed, *cauline ones patulous, 2–3 times longer than broad*; upper part of stem and branches of inflorescence with numerous unequal setæ and long stipitate glands which equal or slightly exceed the setæ. Inflorescence augmented and lax at the end of flowering. Calyx segments porrect and accumbent at the apex, exceeding the throat of the corolla. Fruiting calyx long peduncled, much ampliate at the base and consequently ventricose campanulate. *Limb of* unfolded *corolla campanulate, dull violet, tube pilose* below the ring of hairs in the throat.

3 [p. 13]. P. LONGIFOLIA Bast.—*Leaves spotted* ["very rarely without spots" see p. 14], *radical ones long lanceolate*, 6–9 times longer than broad, when mature about equalling the collateral fruiting stem, upper surface strigose with equilong setæ and some very shortly stipitate glands intermixed; *cauline ones patulous, 5–7 times longer*

than broad; upper part of stem and branches of inflorescence with numerous strong patulous setæ and frequent glands shorter than the setæ. Inflorescence congested even at the end of flowering. Calyx segments subpatent at the apex, scarcely exceeding the throat of the corolla. Fruiting calyx ampliate at the base, campanulate. *Limb of* unfolded *corolla pelviform, dull violet. Tube* quite *glabrous* below the ring of hairs in the throat.

The British plant has the leaves normally spotted, the radical ones exactly as in Kerner's figure of *P. longifolia*, the cauline ones normally patulous, 4–7 times longer than broad; the flower certainly not azure, but purplish blue, pelviform and not campanulate (in Kerner's usage of the terms) with a glabrous tube below the ring of hairs in the throat. It is therefore difficult to see how Kerner could have avoided identifying our plant with his *P. longifolia* had he known it.

With regard to the presence or absence of spots he is very decided. He says (p. 11) "the foliage leaves in the true *P. tuberosa* of Schrank are always unspotted. Those authors who state that *P. tuberosa* also has spotted leaves either do not know the true plant of Schrank, or have mixed several species under this name." Again (p. 16):—"They [Grenier and Godron] therefore believe that both of these species [*P. azurea* and *P. tuberosa*] may have spotted leaves, which I deny; for neither the true *P. tuberosa* of Schrank, nor *P. angustifolia* L. Fl. suec. have spotted leaves, and spotted specimens of '*P. angustifolia*' and of '*P. tuberosa*,' of which Gren. and Godr. implicitly speak, are without doubt the narrow and broad leaved forms of *P. longifolia* Bast."

It seems evident that Kerner had not seen British specimens. His only mention of the British plant is in the account of the distribution:—"*Anglia*. Ins. Wight, Hants and Dorset, Hampshire [*sic*]." This suggests mere book knowledge. He may have relied on the figure in *English Botany*, where the leaves are figured without spots: the text, however, says "much less spotted" than those of *P. officinalis*. The specimens in Herb. Sowerby have the radical leaves conspicuously spotted, the stem leaves evidently, though less, so. Bromfield, Syme, and Babington all refer to the spots; only F. N. Williams, who names it *P. azurea*, omits mention of them.

By the kindness of Dr. Sharp and Miss Pifford I have received large fresh series of the plant from Brockenhurst. The spotting is very variable. Most commonly three or four rather large spots on each side of the midrib; sometimes very numerous to few small ones are also scattered over the leaf. The spots are quite commonly absent, but may vary in number on the same plant. They are usually pale green, but are sometimes, as in the Sowerby specimens referred to, very conspicuous and white. Bromfield says "the leaves are usually nebulously spotted with greenish white, more rarely quite plain; sometimes these spots are very large, and confluent, occupying the greater portion of the leaf." This last phrase would fit *P. saccharata* exactly, and such confluence has so far not been noted except for this and (rarely) the closely allied *P. affinis*. But some of a fine series of plants sent from near Wimborne (Dorset) by Miss V. M. Dale agree exactly with this description. The leaves of one plant were unspotted; all the rest had large white spots; two were white over quite half the leaf surface. The only other Dorset specimens I have seen (East Morden, Mansell Pleydell: Herb. Mus. Brit.) have conspicuous white spots. These Dorset plants have a facies rather distinct from the Brockenhurst ones, but since Bromfield describes the same variation of spots for the Isle of Wight plants they are probably the same. The distribution of this form requires to be investigated, for none of the numerous Isle of Wight and New Forest specimens seen in Herb. Mus. Brit., Herb. Kew, and Herb. Bailey show the confluent spots.

The spotting is much more variable than Kerner would lead us to suppose. In spite of his categorical statements, specimens from the Rhine provinces which he refers (to judge from the distribution given) to *P. tuberosa* occasionally show very faint shadowy spots. But the range of variation and the frequency of spots in the British plant are evidently those of *P. longifolia*, for Kerner says that of this the spots are usually not numerous, sometimes on single leaves only two or three, or very rarely none.

P. angustifolia (*azurea*) appears (to judge *ex sicco*) to be a very distinct species. It is well represented in numbered exsiccatæ—Reichenbach 238, Schultz 323, 323 bis, Fries i. 14, Woloszczak (fl. polon. exs.) 463, Dörfler 5137, Kerner (Fl. Exs. Austr.-Hung.) 927; all as *P. angustifolia* except Reichenbach's which is named *P. azurea*. The broader-leaved southern form (var. *latifolia* Rouy) is perhaps not identical: the fact that Kerner could draw no clear line between it (*cf.* Paulin 169, as *P. angustifolia*) and the typical form may be merely due to the presence of crossing. The phrase "or oblong lanceolate" in the description given of the radical leaves refers to this plant. The typical form is very distinct in its habit and leaf shape, and especially in its colour, a most beautiful blue. Ray (Hist. i. 489: 1686) says "flores colore caeruleo adeo eleganti nitent, ut *Gentianellae vernae* floris venustatem si non superare, attamen proxime aemulari videantur." I have seen specimens of *Pulmonaria azurea* from Miss Jekyll's garden of which the remark might well have been made. I was unfortunately unable to compare this fresh with British plants, but I think one might certainly call the latter comparatively purplish-blue, although I thought them almost "azure" before seeing Miss Jekyll's plant.

Kerner's other characters are of variable worth. The shape of the radical leaves when mature is characteristic. The British plant is evidently, on that character, *P. longifolia*, it being remembered that, as Kerner points out, the leaves are very variable in breadth, the narrower simulating *P. angustifolia*, the broader *P. tuberosa*, although they always have a somewhat different look which is difficult to define. A series received fresh (July 23) were from 20 to 34 cm. long, 3–5 cm. broad, the laminæ mostly about 4·5 times as long as broad, the whole leaf usually about 6 times, but sometimes 9 times: in Herb. Mus. Brit. is a leaf 60 cm. long and 9 cm. broad. They are usually longer than the fruiting stems, but there seems considerable variation in this respect in all the species. The flower stems of *P. azurea* are in wild specimens rather dwarf, but those from Miss Jekyll's garden were over 20 cm. high. These latter have less narrow and less "erect" cauline leaves, just as small narrow-leaved specimens of *P. longifolia* tend to lose the spreading leaves and to have them erect; even then they match Kerner's figure of the fruiting stems.

The unequal length of the setæ appears to require more investigation. Young ones are naturally shorter: setæ are *never* all equal in length in any specimens I have examined. But they are definitely all setæ, the indumentum in all three being very distinct from that of *P. saccharata* which should have been excluded by Kerner from his *Strigosae*. The importance of the glandular hairs appears to have been magnified. In drying, these adhere to the leaf and are indistinguishable except with a fairly high-powered binocular dissecting microscope. They are then easily seen, and all the specimens of *P. azurea* I have seen possess them. They appear exactly similar on the leaves of *P. azurea* and *P. longifolia*. Absence of fresh material has prevented comparative investigation of them on the inflorescences, and in the dry they do not appear to agree with Kerner's remarks. In the foregoing characters given by Kerner, the variation would seem to have been given a precision which the facts do not warrant; but more observation in the field in respect of them is required before their true value can be known. Kerner grew his species in the garden, a method which must tend to give undue emphasis to characters of the particular individuals grown as opposed to the true specific characters.

In the shape of the corolla our plant exactly agrees with Kerner's figure of *P. longifolia*. The hairs on the tube of the corolla appeared at first to be an unsound character, completely variable in degree from considerable to almost nothing. But when the tubes of fresh flowers of Miss Jekyll's *P. azurea* and the New Forest plant had been seen, a real distinction seemed possible. In these, the hairs formed a nearly straight circle all round the tube. In the others the hairs are more in five curved groups, with their edges continued down the veins. But this character requires to be tested to determine the limits of variation in each.

It is possible that there are more forms (local races?) than have yet been recognised; it is on the other hand equally possible that there are fewer forms with greater variability. But as they are at present understood it seems evident that our plant is not *P. azurea*.

P. longifolia from abroad is uncommon in British Herbaria, but what material there is seems to be exactly the same as our Hampshire plant. Its synonymy etc. is as follows:—

P. LONGIFOLIA Boreau [! in Herb. Mus. Brit.], Fl. Centr. Fr., ed. 3. ii. 460 (1857); Martr.-Don., Fl. Tarn, 487 (1864); Dumortier in Bull. Soc. Bot. Belg. iv. 32 (1868); emend. [*cf.* Kerner, pp. 15–16] Kerner, Mon. Pulmon., 13 (1878); Rouy, Fl. France, x. 295 (1908); "*P. angustifolia* ? b. *P. longifolia*" Bast., Fl. Maine et Loire, Suppl., 44 (1812) ex loc. class., fide Kerner, l. c.

P. angustifolia auct. angl., non L. emend. Kerner.

P. azurea Williams, Prodr. Fl. Brit. i. 251 (1909), non Besser (! in Herb. Mus. Brit. & Herb. Kew).

P. tuberosa Gren. et Godr., Fl. Fr., ii. 526 (1852) et Willk. et Lange, Prodr. Fl. Hisp., ii. 498 (1870), partim, quoad plant. fol. maculat.

Icones:—Kerner, op. cit. t. 2. (bona); Eng. Bot. t. 1628.

Exsiccata:—Billot, 1277 (as *P. tuberosa*) partim, quoad specc. "Vendée" lect., 2508 (as *P. longifolia*) folia immaculata; Willkomm, It. hisp. secund., 91 (as *P. azurea*).

Distribution:—England: Hampshire, many localities in the New Forest and north Isle of Wight (see Townsend, Fl. Hampsh. ed. 2, 317: 1904); Dorset, several localities (see Mansel Pleydell, Fl. Dorset, ed. 2, 217: 1895); see also Phytologist, 1846, p. 454—"an outcast in Surrey"; also a doubtful record in a list of Ipswich plants (Mag. Nat. Hist. N.S. iv. 319: 1840) as "Roadsides, local," but *cf.* Phytol. 1844, p. 1108; ? Belgium [Kerner]; West France!, from Paris southwards; Spain!; Portugal [Coutinho in Bol. Soc. Brot. xxi. 142: 1905].

This is an interesting addition to the list of species representing the "western" or "southern" element in our Flora (*cf.* Stapf in Engl. Bot. Jahrb. vol. 50, Engler Fest. 499: 1914).

A second species has been included in our lists, viz. *P. officinalis.* I cannot agree with Syme that it is "very similar to *P. angustifolia*"; its cordate summer radical leaves are quite different from anything else in the genus (if we include *P. obscura*) with the possible exception of a few doubtful species which are not yet properly understood. Confusion has been caused with *P. affinis*, since in the spring only the ovate (not cordate) autumn leaves remain, and these are very similar to those of that plant. But the presence of very short minute equal setæ which Kerner calls aculeoli—though Kerner's figures of them are entirely misleading—are characteristic of *P. officinalis.* The characters of the cordate summer leaves with these aculeoli would enable us to separate a very distinct series if it were not for the somewhat transitional *P. vallarsæ* Kern., which has subcordate leaves, with a clothing of big aculeoli which show a tendency to develop into what Kerner calls "puberes."

Dumortier (*l. c.*) makes two species from *P. officinalis* L.:—

1. P. OFFICINALIS L. excl. var. β et γ, emend. Dumort., et Kerner.

Leaves spotted, radical ones ovate-cordate, acute, with thick semiterete, laterally winged petiole.

2. P. OBSCURA Dumort. (*P. officinalis* var. β et γ Linn., var. *immaculata* Opiz.).

Leaves unspotted, radical ones oblong-cordate, acuminate, with slender laterally compressed and "superne bicarinato" petiole. Kerner states that as the result of many years' cultivation, including raising them from seed, he can confirm Dumortier's observations. He therefore keeps them as distinct species. No other differentiating characters appear to exist, but the distributions given are in favour of their distinctness. Both are said to grow in Central Europe, but whereas in Russia, Sweden, and Denmark only *P. obscura* occurs, in S. Switzerland, continental Italy, South Austria, and Bosnia, only *P. officinalis* is found.

As regards their occurrence in Britain, "possessing little claim to be considered native, though occurring in many places in England and the south of Scotland" (Syme), the first definite record, excluding the erroneous one by Hudson, is in Eng. Bot. t. 118 (1793, July 1). "Wild specimens" were said to occur at Darlington.

As was pointed out by Robson (E. B. 1628) the root leaves in that figure are from some other species, and a new plate was made for ed. 3. Various other records occur, but the local floras now place all of them as adventitious—presumably escapes from gardens,—except that of Burgate Wood, Suffolk. In that wood an unspotted *Pulmonaria* occurs in profusion, and is believed to be native by C. J. Ashfield (Phytol., N.S. vi. 351 : 1862), W. M. Hind (Fl. Suff. 243 : 1889), and the Rev. E. S. Marshall (in sched., Herb. Mus. Brit.). Since the leaves are unspotted it is evidently "*P. obscura* Dum.," but fresh specimens have not been seen to confirm the petiole character. All other British specimens seen have spots and are *P. officinalis* L. excl. vars. Judging from the distribution, *P. obscura* is the more likely form to be native.

Collectors should remember that specimens without mature (summer) root-leaves are often worthless, these, with the collateral fruiting stems, should be sent out with the flowering stems. Collectors would also do well to split down a few corollas and press them opened out : this permits examination of the hairs on the tube which is very difficult or impossible after boiling. The same applies to all genera where diagnostic characters are derived from parts concealed by pressing, e. g. *Orobanche* (especially), *Cuscuta* etc.

MUSCINEÆ OF ACHILL ISLAND.

By D. A. Jones.

In the early part of August 1911 a party consisting of Messrs. J. C. Wilson and J. B. Duncan, the late Mr. S. J. Owen and the writer visited Achill Island on the west coast of Ireland to explore its cryptogamic flora. We took up our headquarters at the village of Dugort. The greater part of the week was spent on Slievemore, a mountain rising almost abruptly from the shores of Blacksod Bay to the height of about 2204 feet. This mountain is remarkable for its mosses and hepatics, the variety and luxuriance of which equal anything found in the British Isles. It was somewhere here that the Rev. Canon Lett, after having wandered for some time in a sea mist, which had suddenly overtaken him, found among his gatherings, mixed with other plants, a few stems of one of the most interesting hepatics discovered during recent years—I refer to *Adelanthus dugortiensis* Douin & Lett. The chief object of our expedition was to search for this rare plant, which had not been found since its discovery by Canon Lett in the year 1903.

The peculiar feature of Slievemore is the masses of vegetation which mark its northern face forming compact "hummocks" over four feet in height. They are mostly composed of *Hymenophyllum peltatum*, *Scapania gracilis*, *Plagiochila spinulosa*, and *Bazzania tricrenata*, with *Adelanthus dugortiensis* imbedded in the mass of vegetation and appearing here and there as small, rounded, and pure tufts on the even and almost vertical surface of these hummocks.

Their beauty is further enhanced by the presence of a fine lot of *Herberta adunca* Gray whose slender stems intertwine with fern and hepatic, producing a ruddy glow which cannot fail to attract attention from a distance. *Scapania ornithopodioides*, a rare hepatic, occurs in large reddish purple patches on the moister ground and *Mastigophora Woodsii*, which sometimes accompanies it, is not uncommon and adds to the wealth of colour and vegetation of that wonderful mountain. On the hard and shining schistose rocks *Campylopus Schwarzii* and *Dicranum uncinatum* with its beautiful falcato-secund leaves thrive. These rocks are a prominent feature of the landscape and several of the smaller and rarer hepatics find shelter in their damp nooks and crannies.

The hepatic flora of the district is more varied and interesting than its moss flora.

Canon Lett has spent several weeks on the island and the Rev. C. H. Waddell together with Messrs. W. H. Pearson, D. McArdle, and R. Ll. Praeger have visited it on several occasions.

The following is a list of the mosses and hepatics which we found. I might mention that time did not permit us to pay much attention to the Sphagna, so that the number of species of peat mosses is incomplete. *S.* stands for Slievemore; *D.* for Dugort. Where no letter is appended, the plant was found only on Slievemore. New records for Ireland are marked by an asterisk.

The order followed for both groups is that of the Moss and Hepatic Exchange Club Catalogues. The Sphagna are after Warnstorf.

MUSCI.

Sphagnum cymbifolium (Ehrh.) W., var. *glauco-pallens* Warnst., var. *glaucescens* Warnst., var. *pallescens* Warnst., bog at foot of Slievemore.—*S. papillosum* Lindb. var. *normale* Warnst., abundant; var. *sublæve* Limpr.—*S. compactum* var. *imbricatum* Warnst.—*S. cuspidatum* (Ehrh.) Warnst., var. *falcatum* Russ.; var. *submersum* Schp.; var. *plumosum* Bry. germ., S., D.—*S. recurvum* (P. B.) Warnst., var. *mucronatum* (Russ.) Warnst., and var. *amblyphyllum* (Russ.) Warnst., S., D.—*S. molluscum* Bruch., S., D.—*S. rubellum* Wils., var. *purpurascens* Warnst.; var. *rubrum* Grav.; var. *versicolor* Russ., all not uncommon, S., D.—*S. subnitens* Russ. & Warnst., abundant, fruiting freely. The most common forms of this species were:—var. *flavo-rubellum* Warnst.; var. *obscurum* Warnst.; var. *purpurascens* Schlieph.; var. *versicolor* Warnst.; var. *virescens* Warnst.—*S. acutifolium* Russ. & Warnst., var. *flavo-rubellum* Warnst., S., D.; var. *purpurascens* Warnst., S., D.; var. *versicolor* Warnst. & var. *viride* Warnst., S., D.—*S. contortum* Schultz, S.; *S. inundatum* (Russ.) Warnst., S., D.; *S. rufescens* (Bry. germ.) Limpr.

Andreæa petrophila Ehrh.;—*A. Rothii* var. *falcata* Lindb.

Polytrichum aloides Hedw.; *P. urnigerum* L., roadside, Dugort; *P. alpinum* L.; *P. piliferum* Schreb.; *P. juniperinum* Willd., D.; *P. formosum* Hedw.; *P. commune* L.

Archidium alternifolium Schp., roadside, D.

Ditrichum homomallum Hampe, D.

Ceratodon purpureus Brid., S., D.

Rhabdoweisia denticulata B. & S.

Dichodontium pellucidum Schp., and var. *fagimontanum* Brid., roadside, D.

Dicranella heteromalla Schp., S., D.; var. *interrupta* B. & S., S.; *D. varia*. Schp., D.; *D. squarrosa* Schp. cfr.

Blindia acuta B. & S.

Campylopus subulatus Schp., roadside, D.; *C. Schwarzii* Schp.; *C. flexuosus* Brid., S., D.; *C. pyriformis* Brid., S.; *C. fragilis* B. & S. (cfr.), D.; *C. atrovirens* De Not., S., D.; *C. introflexus*, Brid., D.; *C. brevipilus* B. & S., D.

Dicranodontium longirostre var. *alpinum* Schp.

Dicranum scoparium Hedw., S., D., var. *orthophyllum* Brid., D.; *D. majus* Turn., D.; *D. fuscescens* Turn., S.; *D. Scottianum* Turn., D.; *D. uncinatum* C. M.

Leucobryum glaucum Schp., S., D., common.

Fissidens bryoides Hedw., S., D.; *F. osmundoides* Hedw.; *F. adiantoides* Hedw.; *F. taxifolius* Hedw., S., D.

Grimmia apocarpa Hedw.; *G. maritima* Turn., D.; *G. pulvinata* Smith, D.; *G. trichophylla* Grev., S., D.

Rhacomitrium ellipticum B. & S.; *R. aciculare* Brid.; *R. protensum* Braun, S., D.; *R. fasciculare* Brid., S., D.; *R. heterostichum* Brid., S., D.; var. *alopecurum* Hübn., and *gracilescens* B. & S.; *R. sudeticum* B. & S.; *R. lanuginosum* Brid., common in S., D.

Ptychomitrium polyphyllum Fürn., common in S. and D.

Hedwigia ciliata Ehrh.

Pottia truncatula Lindb., D.

Tortula muralis Hedw., common, D.; *T. ruralis* Ehrh., D.; *T. ruraliformis* Dixon, D.

Barbula rubella Mitt., S., D.; var. *ruberrima* Ferg., in quantity on rocks, Slievemore, ca. 1800 feet; *B. tophacea* Mitt., D.; *B. fallax* Hedw., D.; *B. rigidula* Mitt., D.; *B. cylindrica* Schp., *vinealis* Brid., *revoluta* Brid., *convoluta* Hedw., var. *Sardoa* B. & S., *unguiculata* Hedw., all found in D.

Leptodontium flexifolium Hompe.

Weisia viridifolia Hedw., S., D.; *W. rupestris* C. M., S. **W. curvirostris* C. M. var. *commutata* Dixon, walls near D.; the tufts not so tall as usual in the variety, but the cells are mostly elongated and smooth.

Trichostomum mutabile Bruch and var. *littorale* Dixon, S., D.; *T. tenuirostre* Lindb.; *T. flavovirens* Bruch, S., D.; *T. tortuosum* Dixon, S., D.

Anœctangium compactum Schwaeg.

Zygodon Mougeotii B. & S., in fine tufts.

Ulota phyllantha Brid., not uncommon on boulders and furze about D.; *U. Hutchinsiæ* Hamm., D.

Splachnum sphæricum Linn. fil., sparingly on Slievemore.

Funaria ericetorum Dixon: *F. Templetoni* Sm.; *F. hygrometrica* Sibth., D.

Amblyodon dealbatus P., Beauv., D.

Aulacomnium palustre Schwaeg., D.

Philonotis fontana Brid,, D.

Bryum pallens Sw.; *B. pseudotriquetrum* Schwaeg.; *B. argenteum* L., S., D.

Mnium hornum L., S., D.; *M. punctatum* L.

Fontinalis antipyretica L.

Pterygophyllum lucens Brid.

Heterocladium heteropterum B. & S.

Thuidium tamariscinum Mitt., D.; *T. delicatulum* Mitt.

Climacium dendroides Web. & Mohr, D.

Camptothecium sericeum Kindb., D.; *C. lutescens*, D.

Brachythecium albicans B. & S., D.; *B. salebrosum* B. & S., var. *palustre* Schp. c.fr., D.; *B. rutabulum* B. & S., S., D.; *B. rivulare* B. & S., S.; *B. velutinum*, B. & S., S., D.; *B. populeum* B. & S., D.; *B. purum* Dixon, S., D.

Hyocomium flagellare B. & S.

Eurhynchium prælongum Hobk., S., D.; *E. myosuroides* Schp.; *E. myurum* Dixon; *E. striatum* B. & S.; *E. confertum* Milde.

Plagiothecium elegans Sull.; *P. denticulatum* B. & S.; *P. undulatum* B. & S.

Amblystegium filicinum De Not.

Hypnum stellatum Schreb.; *H. revolvens* Schwartz.; *H. commutatum* Hedw.; *H. cupressiforme* L., S.. D.; *var. *tectorum* Brid., S., D.; var. *ericetorum* B. & S. **H. Patientiæ* Lindb., roadside, D.; *H. callichroum* Brid.; *H. molluscum* Hedw., S., D.; *H. cuspidatum* L., S., D.; *H. Schreberi* Willd., S., D.

Hylocomium splendens B. & S., S., D. The var. *gracilius* Boul., so common among the sandhills of North Wales, does not seem to occur on the part of the coast we explored. *H. loreum* B. & S. c.fr., S.; *H. squarrosum* B. & S. and *H. triquetrum* B. & S., S., D.

HEPATICS.

Preissia quadrata (Scop.) Nees.

Aneura pinguis (L.) Dum.; *A. multifida* (L.) Dum.; **A. major* (Lindb.) K. Müll.; *A. palmata* (Hedw.) Dum.

Metzgeria furcata (L.) Dum., S., D.; *M. hamata* Lindb.

**Moerckia Flotowiana* (Nees) Schiffn. This interesting addition to the flora of Ireland I found growing in a gully on the northern side of Slievemore, at about 1800 feet. The fronds are longer and narrower than in our maritime form, due no doubt to the greater amount of moisture and the absence of direct sunlight during some parts of the year.

Pellia epiphylla (L.) Corda; *P. Fabbroniana* Raddi.

Fossombronia angulosa (Dicks.) Raddi, rocks by the sea, immediately below Slievemore—a rare hepatic found by Mr. J. C. Wilson.

Gymnomitrium crenulatum Gottsche.

Marsupella emarginata (Ehrh.) Dum.; **M. Pearsoni* Schiffn.

Alicularia compressa (Hook.) Nees; *A. scalaris* (Schrad.) Corda.

**Eucalyx obovatus* (Nees) Breidl., var. *rivularis* Schiffn.—in large tufts in wet places.

Haplozia crenulata (Sm.) Dum. and var. *gracillima* (Sm.) Heeg, S., D.; *H. sphærocarpa* (Hook.) Dum.; *H. riparia* (Tayl.) Dum.

Gymnocolea inflata (Huds.), Dum., S., D.

**Lophozia badensis* (Gottsche) Schiffn., rocks near the sea, D.; *L. Muelleri* (Nees) Dum.; *L. ventricosa* (Dicks.) Dum.; *L. alpestris* (Schleich.) Evans; *L. incisa* (Schrad.) Dum., S., D.; *L. excisa* (Dicks.) Dum.; *L. quinquedentata* (Huds.) Cogn., S., D.; *L. attenuata* (Mart.) Dum.

Sphenolobus minutus (Crantz) Steph. **Sphen. Pearsoni* (Spruce) Steph. Found by Messrs. Owen and Wilson, growing sparingly on boulders on the N.E. side of Slievemore. This beautiful plant was first described from specimens gathered by Mr. W. H. Pearson on boulders below Devil's Kitchen, Cwm Idwal, Carnarvonshire. Since then its distribution has been extended, for it is recorded from six vice-comital areas in the British Isles, several of which are in Scotland. In August 1913 we found it on Ben Douran, Argyllshire, and it has been discovered also in a few localities in the County of Merioneth. **Sphen. exsectus* (Breidl.) Steph.; *Sphen. ovatus* (Dicks.) Schiffn.

Anastrepta orcadensis (Hook.) Schiffn.,—not uncommon on Slievemore, scattered among mosses and other hepatics. This forms a third record for Ireland.

Plagiochila asplenioides (L.) Dum. and var. *minor* Lindenb.; *P. spinulosa* (Dicks.) Dum., S., D.; *P. punctata* Tayl., S., D.

Leptoscyphus Taylori (Hook.) Mitt.; *L. cuneifolius* (Hook.) Mitt.—another very rare plant growing sparingly on *Frullania Tamarisci* (L.) Dum. in the lower parts of Slievemore.

Lophocolea bidentata (L.) Dum., S., D.

Chiloscyphus polyanthus (L.) Corda, D.

Cephalozia bicuspidata (L.) Dum., S., D.; *C. connivens* (Dicks.) Lindb., D.; *C. media* Lindb., S., D.; *C. leucantha* Spruce has a very limited distribution in Ireland having been found only in Killarney, West Galway, and Clare Island previous to its discovery by Canon Lett and Mr. McArdle on Slievemore, where it occurs on peat at the foot of the mountain. It is not known to grow in England and has only lately been added to the flora of Wales, but is well distributed throughout Scotland.

Nowellia curvifolia (Dicks.) Mitt.

Odontoschisma Sphagni (Dicks.) Dum., S., D.

Adelanthus decipiens (Hook.) Mitt. We met with a depauperated form of this hepatic on rocks at the summit of Slievemore, a rather unusual habitat. *A. dugortiensis* Douin & Lett. As Mr. Macvicar mentions in the *Handbook to British Hepatics*, this beautiful species is a survivor of the pre-glacial period, when the climate of these islands was warmer than it is at the present time. It is allied to *A. unciformis* (Tayl.) found in Tierra del Fuego at the extreme southern end of South America. The fruit is unknown. The plant bears a close resemblance to *Anastrepta orcadensis* in habit, in fact we mistook it for that plant at first: the dentate postical lobe, however, separates it from the commoner hepatic and this difference can be readily seen by means of an ordinary lens. It occurs here and there up to 1700 feet or higher on the northern face of Slievemore and forms part of the hummocks, already alluded to. It seems, however, to be more at home on rocky ledges, where the finest tufts were found, unmixed with other hepatics. It was first detected by Mr. J. B. Duncan. We had planned to investigate its distribution along the range of hills, of which Slievemore forms the northern limit, but the weather proved unfavourable.

Calypogeia Trichomanis (L.) Corda, S., D.; *C. fissa* (L.) Raddi, S., D.; *C. arguta* Nees & Mont.

Bazzania trilobata (L.) Gray; *B. tricrenata* (Wahl.) Pears.; *B. Pearsoni* (Steph.) Pears., a beautiful and exceedingly rare plant, Killarney hitherto being the only known station. It covers ledges of rocks at 1700 feet, growing with *Scapania nimbosa* Tayl. and *S. ornithopodioides* (With.) Pears. Mr. Pearson and Canon Lett first found it in this locality.

Lepidozia pinnata (Hook.) Dum.; *L. trichoclados* K. Müll.; *L. setacea* (Web.) Mitt.

Blepharostoma trichophyllum (L.) Dum.

Anthelia julacea (L.) Dum.

Herberta adunca (Dicks.) Gray.

Mastigophora Woodsii (Hook.) Nees, in fine yellowish-brown patches on the sloping ground between the hummocks.

Ptilidium ciliare (L.) Hampe.

Diplophyllum albicans (L.) Dum., S. D.

Scapania compacta (Roth) Dum., S., D.; *S. gracilis* (Lindb.) Kaal., abundant on Slievemore; var. *laxifolia* Carr.; *S. nemorosa* (L.) Dum. and var. *uliginosa* Jensen; *S. ornithopodioides* (With.) Pears.; *S. dentata* Dum.; *S. undulata* (L.) Dum.; *S. nimbosa* Tayl., D. Moore in his *Report on Irish Hepaticæ* writes:—"Hab. Among the larger mosses etc. On Brandon Mountain, Co. Kerry. Dr. Taylor. I know nothing of this plant further than the quotations transcribed testify." This record dates from 1813 and was the only one for Ireland. It is apparently rare on Slievemore, only a few stems being found, distributed here and there among *S. ornithopodioides* and *Bazzania tricrenata* and *Pearsoni* on ledges of rocks at an altitude of about 1700 feet. Mr. Macvicar found it at Moidart, Argyllshire, in 1898, and since then it has been discovered on Ben Nevis and Glen Nevis, where I gathered it under the guidance of Mr. H. H. Knight in August 1909. In October of the same year, I met with it among the scree in one of the cwms of Glyder Fawr, Carnarvonshire. It is one of the most beautiful as well as the rarest of our hepatics.

S. irrigua (Nees) Dum.; *S. curta* (Mart.) Dum.; *S. umbrosa* (Schrad.) Dum.

Radula Lindbergii Gottsche; *R. aquilegia* Tayl.

Pleurozia purpurea (Lightf.) Lindb.

Colurolejeunea calyptrifolia (Hook.) Schiffn., on damp rocks.

Cololejeunea microscopica (Tayl.) Schiffn.

Lejeunea cavifolia (Ehrh.) Lindb.; *L. patens* Lindb.

Microlejeunea ulicina (Tayl.) Evans.

Drepanolejeunea hamatifolia (Hook.) Schiffn.

Harpalejeunea ovata (Hook.) Schiffn.

Frullania Tamarisci (L.) Dum., S., D.; *F. microphylla* (Gottsche) Pears.; *F. fragilifolia* Tayl.; *F. dilatata* (L.) Dum.

Note.—In a paper on the Mosses and Hepatics of Killarney written by me and published in this Journal for 1913. pp. 177–182, the following record was by an oversight omitted:—*Lejeunea diversiloba* Spruce. This beautiful hepatic, known to occur only in the South-west of Ireland, is well distributed throughout the Killarney district, mixed with mosses and other hepatics. We gathered it at Tore Cascade, Tore Mountain (in pure tufts), Eagle's Nest, Cromaglown etc.

LIPARIS LILIIFOLIA AND L. LOESELII.

By James Britten, F.L.S.

Having occasion to look up a point in connection with one of these plants, I found that at an earlier period they had been greatly confused. It is not quite easy to see how this could have happened, for the species, even in the herbarium, are abundantly and obviously distinct, and the geographical range of the former excludes it from the European flora. On looking into the matter, various points presented themselves which may be of sufficient general interest to place on record.

The confusion originated with Linnæus in his description of *Ophrys lilifolia* (Sp. Pl. 946: 1754), and formed the subject of a long note by Dryander in the too-little-consulted Solander MSS. (xviii. 351–4) which I cannot do better than transcribe:

"Linné has in *Hortus Cliffortianus* [p. 429] taken up the English and Dutch plant (*O. Loeselii*) and added the plant found in Sweden by Celsius. In the first edition of *Species Plantarum* [p. 946], after having received the American plant, he takes that up under the name of *O. lilifolia* adding the synonym from *Hortus Cliffortianus* with 'vix memini?' leaving out the mention of England and Holland in the locus, but keeping up Celsii locus. At the same time he takes up *Ophrys Loeselii* as a distinct species, also found in Sweden. In the 2nd edition of *Flora Suecica* he has both species, the *lilifolia* from the specimen collected long before by Celsius, which he had not at hand to compare, having only seen it 20 years before, and the *O. Loeselii*, from specimens collected by Loefling. Most probably Celsii plant was *O. Loeselii* . . . . The plant figured in the Philos. Transact. lays in Gron. herb. for *Epidendrum* fl. virg. 140, but it cannot be Clayton's 260 as he describes flores pallide rubentes, which in this are white. What lays in Gron. herb. for *Ophrys* fl. virgin. 138 (*lilifolia*) seems to be the European plant or *Loeselii*."

The specimens referred to in the last sentence are in the National Herbarium, with which Gronovius's plants are now incorporated. Dryander is right in both his determinations, but there seems no reason for doubting the identity of Clayton's no. 260 with Gronovius's "Epidendrum caule erecto," etc. Clayton's number, though not his name, is cited on the label of Gronovius's specimen and his diagnosis, so far as can be judged, was based upon Clayton's plant, to which Clayton's description—"Bifolium potius Orchis floribus pallide rubentibus, calcare longo donatis"—sufficiently applies. The lip of this—its most conspicuous feature—is described by Ehret (Phil. Trans. liii. 82, t. iv.) as "of a pale red colour, marked with red veins"; the sepals are described as "of a bloody-red colour," and in his original sketch, to be referred to later, bear out this description. Chapman (Fl. S. United States, ed. 3, 479) calls the lip brownish purple and the published figures bear out this statement: Dryander's statement that the flowers are white is, I think, an incorrect inference from the appearance of the dried plant.

It seems strange that Linnæus should cite Gronovius's "Ophrys scapo nudo" etc. as a synonym of *O. lilifolia* and should have overlooked his "Epidendrum caule erecto" etc.: for Gronovius's own specimen of the former, as Dryander points out, is certainly *O. Loeselii*.

In view of the specimen named by himself in his herbarium, there seems no reason to suppose that Linnæus had not the right plant in view when he described his *O. lilifolia*, although his description hardly differentiates it from *O. Loeselii*, to which his synonymy (including the citation from Gronovius, judging from the specimen so named by him) belongs. The distribution he gives—"Habitat in Virginæ, Canadæ, Sueciæ paludibus" shows the same confusion, for *O. lilifolia* is not European—a fact which excludes from that species the specimen from Celsius, referred to in Dryander's note, and also the entry, based upon this, in Fl. Suecica ed. 2, 316, where the name is misprinted "*latifolia*." That Linnæus himself was doubtful as to the identity of the European and American plants is shown by the note appended to his description of *O. lilifolia*—"Planta virginica sexies major nostrate, ab structura eadem, notabilis flore: petalis exterioribus linearibus."

It is interesting to note the gradual progress of differentiation of the two species. In the *Systema* (ed. 11, 1244, 1760) the omission of synonymy obviates confusion: in ed. 12, ii. 592 (1767) where the name is misprinted *linifolia*, the true plant is precised by the citation of Ehret's figure, but a new element of confusion is introduced by the introduction of a variety β based on *Epipactis foliis binis ovatis* etc. of Haller (Act. Helvet. iv. 120, 1760). There can I think be little doubt that this was *Loeselii*; in any case the locality—"inter Gottingam et Pirmont"—excludes the American plant. In Gmelin's edition of the *Systema* ("editio decima tertia, aucta, reformata," 57, 1791) Ehret's figure is the only citation for the species. Willdenow in 1805 describes *lilifolia* quite clearly, but quotes Gronovius's "*Ophrys scapo nudo*" etc. in synonymy: in view of the fact already pointed out that Gronovius's specimen thus labelled by himself is *Loeselii* and that he describes *lilifolia*, of which we have also his named specimen, under another name, there seems no reason for assigning his brief descriptive phrase, which applies equally to both species, otherwise than to the plant to which he himself referred it. It is worth noting that Ehret, who certainly knew the plant, of which he gives a full description, and was the first to figure it satisfactorily, heads his paper: "An Account of a Species of Ophris, *supposed to be* the Plant which is mentioned by Gronovius in the *Flora Virginica*, p. 185, under the name of *Ophris scapo nudo*" etc. and proceeds to show that his plant differs from the detailed description by Clayton which Gronovius quotes as a synonym of his species. The excellence of Ehret's figure is noted by Solander (MSS. xviii. 350, where is a full description of the plant in a hand—not Ehret's—which I do not recognise): "Dr. Ehret figuram optime delineatam in ejus collectione habet": this would seem to refer to a finished drawing for which we have the sketch.

Ehret's figure was taken from a specimen sent him in a letter by Peter Collinson, in whose garden it "blew," for the first time in England, in 1758: Collinson had "received it from Mr. Bertram of Philadelphia"—*i. e.* John Bartram. We have in the volume of Ehret's sketches (no. 148) the sketch for the plate, with a note: "Received of Mr. P. Collinson in a letter June 20, 1758": there is a specimen in Herb. Banks from Collinson's garden with a MS. name by Solander, under which the plant was described in the Solander MSS. *l. c.* Andrews (Bot. Repos. t. 65), not knowing of Ehret's paper, described and figured it in 1800 as "perfectly new in our gardens" from a specimen sent to the Marquis of Blandford from Philadelphia in 1796. It had, however, in a dried state, been sent previously to Plukenet by Banister, who was in Virginia 1679–89: it is described in the *Amaltheum* (705) p. 162, n. 8, as "Orchis Lilifolius minor Floridana, floribus amoenè purpureis amplis." Plukenet's label on the specimen in his herbarium (Herb. Sloane, xcii. f. 100) is worded somewhat differently: "Orchis parvus bifolius Floridanus flosculis amoenè purpureis peramplis." The reference to the size of the flowers is comparative with that of the preceding species (n. 7) in which they are described as "parvus": on the plate of *L. lilifolius* (*Phytographia*, t. ccccxxxiv. fig. 9) reference is made to "fol. 162, pl. 7. Amalth." but this is evidently an error, as Plukenet has attached the name of n. 7—"Orchis minor Floridana floribus parvis in spica brevi rarius dispositis"—to a specimen (apparently of a *Habenaria*) in H. S. xciv. f. 30. The figure in *Phytographia* is not in this instance taken from the specimen, and is not very satisfactory.

The history of the confusion in British books is easy to trace. *Ophrys lilifolia* was included by Linnæus in his *Flora Anglica* (1754) and by Hudson in his first edition (1762): in his second edition (1778) he retains the name *lilifolia* but places the British plant as a variety—β. *Loeselii*. Withering in his first edition (1776) and Relhan (1785) also retain the name; but the accurate Stokes in the second edition of Withering (1787) names our plant *Loeselii*, adding: "It seems to be very clear that *O. lilifolia* has never been found in this country": quoting Hudson as "comprehending *O. lilifolia* and *O. Loeselii* as varieties of one species," he says "the reasons for this opinion remain to be assigned." Finally Smith (Eng. Bot. t. 47: 1792?), referring to Stokes's observations with approval, writes:

"A confusion, which originated with Linnæus, has long existed between this plant [*O. Loeselii*] and his *Ophrys bifolia*. We can assure the public, on the authority of his herbarium, that the latter is only found in America, and that the European synonyms, which he has in several parts of his works applied to that species, really belong to ours."

Stokes (*op. cit.* ii. 989) refers to "Fl. dan. 877, a very good figure, and much resembles a drawing Mr. Pitchford had taken of his specimen, when he first found it, except that it is larger." This figure is lettered *Ophrys paludosa*: from the accompanying text it appears that Otto Friedrich Mueller (1730–84), who was responsible for the fascicle (xv) in which it was published (1782), misunderstood the species even more completely than Linnæus had done: he writes—"Conferenti descriptiones *Ophr. liliifoliæ Loeselii* et *paludosæ* Linnæi nimis videntur affines nec satis distinctæ."

Withering's note on the same page as to the English localities of *L. Loeselii* contains an erroneous record which seems hitherto to have escaped notice. The note runs: "St. Faith's-Newton bogs near Norwich; a single specimen given to Mr. Lightfoot. *Mr. Pitchford.**—None since found either in Norfolk or Suffolk; but, in 1785, I saw a specimen from Mr. Sole, which was found near Bath. *Mr. Woodw.*"—i. e. Thomas Jenkinson Woodward (1745–1820), to whose "industry and accuracy in botanical investigation" Withering (pref. p. v.) pays a high tribute. The record, however, was erroneous, as in the following (3rd) edition (1796) the locality "Hinton Moor" is substituted for Bath: the plant does not appear in the *Flora of Somersetshire*. *L. Loeselii* was recorded for Glamorganshire by Mr. Riddelsdell in this Journal for 1905 (p. 274), who calls attention to the interest of his discovery as extending the known distribution of the plant in England. In the *Botanical Exchange Club Report* for 1906 (p. 244) Mr. Riddelsdell distinguishes this as variety *ovata*, characterized "by the broader, shorter, blunter leaves and fewer flowers;" a specimen in the British Herbarium of the Natural History Museum (where is also an example from Mr. Riddelsdell) collected in the same year in Carmarthenshire by Mr. H. H. Knight, presents similar characters.

It may be of interest to note that we have in the British Herbarium a specimen to which is attached a label in Lightfoot's hand: "In an Herbarium sold by Lake the Bookseller in Uxbridge, the date of the Collection being in the Year 1678. From many of the specimens it seem'd evidently to be have [*sic*] made in the Neighbourhood of Cambridge." This must be one of the earliest specimens collected in England: the first record of the plant for this country is that of Ray, Cat. Pl. Cantab. 106 (1660).

It may be convenient to present in tabular form the nomenclature of each species as it has been presented in the foregoing notes, with certain additions which may be useful:—

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* Smith (E. B. t. 47) also speaks of the specimen having been "presented" to Lightfoot, but in Rees's *Cyclopædia* (s. v. *Malaxis Loeselii*) he says that Pitchford "exchanged his only specimen with Mr. Lightfoot for above 60 of the rarest British plants."

LIPARIS LILIIFOLIA Lindl. Bot. Reg. sub t. 882 (1825) et auct. plur.

Epidendrum caule erecto, etc. Gronov. Fl. Virg. 111 (1743); ed. 2, 140 (1762) et herb!

Bifolium potius Orchis etc. Clayt. ex Gronov. ll. cc.

Ophrys lilifolia L. Sp. Pl. 946 (1753) excl. syn.: ed. 2, 1341 (1763) excl. reff.; Syst. ed. 11, 1244 (1760); ed. 12, ii. 592 (*linifolia*) (1767), excl. var. β; ed. 13 (Gmelin) ii. 57 (1791).

Ophrys trifolia Walt. Fl. Carol. 221 (1788).

Ophrys lilifolia Andr. Bot. Rep. t. 65 (1799); Redouté, Liliacées, t. 437 (1814).

Malaxis liliifolia Sw. in Kongl. Vet. Acad. (Act. Holm.) xxi. 235 (1800); Willd. Sp. Pl. iv. 92 (1805), excl. syn. Gronov.; R. Br. in Ait. Hort. Kew. ed. 2, v. 208 (*lilifolia*) (1813); Sims, Bot. Mag. t. 2004 (1818), excl. syn. Gron. Virg.

Mr. Ridley (Journ. Linn. Soc. Bot. xxii. 269) cites "[A.] Richard, Mém. Mus. Par. iv. 52" (1818) for the name *L. liliifolia*, but no species are named on that page: on p. 60, under *M. Loeselii*, Richard cites as a synonym "*M. lilifolia* ex ic. Andr. Reposit. t. 65," and adds "vix differt." The name, as stated in *Index Kewensis*, originated with Lindley in his arrangement of *Liparis* in Bot. Reg. t. 882 (1825); he quotes it as of Richard, but, as already shown, Richard did not name the plant.

L. LOESELII A. Rich. in Mem. Mus. Paris, iv. 60 (1818) et auct. plur.

Herminium radicibus ovatis tunicatis, scapo nudo. L. Hort. Cliff. 429 (1737).

Ophrys scapo nudo etc. Gron. Fl. Virg. 185 (1743); ed. 2, 138 (1763).

Ophrys Loeselii L. Sp. Pl. 947 (1754); ed. 2, 1341 (1763); L. Syst. ed. 11, 1244 (1770); With. Bot. Arr. ed. 2, 988 (1787); Sm. Engl. Bot. t. 47 (1792?).

Ophrys lilifolia L. Sp. Pl. 946 (1754) quoad syn.; ed. 2, 1340 (1763), excl. descript.; Fl. Suec. ed. 2. 316 (1755), sphalm. *latifolia*; Syst. ed. 11, 1244 (1770); Fl. Anglica, 23 (1754); Amœn. Acad. iv. 107 (1759); Fl. Suec. ed. 2, 316 (1755), sphalm. *latifolia*; Syst. ed. 11, ii. 1244 (1770); ed. 13 (Gmelin), ii. 57 (1791); Huds. Fl. Angl. 339 (1762); With. Bot. Arr. 548 (1776); Relh. Fl. Cantab. 337 (1785).

Ophrys lilifolia (sphalm. *linifolia*) β, L. Syst. ed. 12, ii. 192 (1767).

Ophrys lilifolia β. Loeselii Huds. Fl. Angl. ed. 2, 390 (1778).

Ophrys paludosa O. F. Müll., Fl. Danica t. 877 (1782), non L. nec auct.

Malaxis Loeselii Sw. in Kongl. Vet. Acad. (Act. Holm.) xxi. 235 (1800); R. Br. in Ait. Hort. Kew. ed. 2, v. 208 (1813).

Malaxis liliifolia Willd. Sp. Pl. iv. 92 (1805) quoad syn. Gronov.

The name *Loeselii* commemorates Johannes Loeselius (1607–55) professor at Königsberg, whose figure and description (t. 58, p. 180) in his posthumous *Flora Prussica* (1703) edited by Johann Gottsched are the only ones cited by Linnæus when establishing the species.

TROPICAL AMERICAN RUBIACEÆ.—IX.

By H. F. Wernham, D.Sc., F.L.S.

(Continued from p. 177.)

Examination of the unnamed material of *Psychotria* and allied genera in the National Herbarium has revealed the following novelties, among others. For the present I am regarding *Palicourea* and *Cephaelis* as of generic rank separate from *Psychotria*, and *Mapouria* as a section of the latter genus. This is the reverse of K. Schumann's arrangement in the *Flora Brasiliensis*, and in accordance with Bentham and Hooker in their *Genera Plantarum*. I hope to deal with this question in the future. Of the new species, three are from Brasil, two from Peru, and the remainder from New Granada, collected by Triana, and, in one case, by Lehmann.

Psychotria (§ Eupsychotria) **Aschersonianoides**, sp. nov. Frutex aspero-hispidulus, ramulis præsertim novellis hispidulo-pubescentibus ferrugineis. *Folia* firme chartacea, ovata ad elliptica, apice subacuta v. obtusa, breviter petiolata, venis secundariis supra plus minus occlusis subtus prominulis crebris utrinque 15–17, utrinque breviter necnon dense hispidula; *stipulæ* crassiusculæ ovatæ insuper bifidæ basin versus vaginantes persistentes. *Flores* in thyrsis minusculis laxiusculis dispositi, *bracteis* paucis linearibus subsetaceis. *Calyx* parvus tamen conspicue acute dentatus; *corollæ* tubus gracilis, longiusculus insuper paullo ampliatus, sparse pilosus, limbus parvus subpatens.

Colombia: *Triana* 195!

Allied apparently to *P. Aschersoniana*, differing in the smaller, scarcely acuminate leaves, the few inconspicuous bracts, and the slender hairy corolla. *Leaves* 5–6 cm. × 1·7–3 cm., with stalks 6–8 mm. long; *stipules* 5–6 mm. long. *Inflorescence* 4–6 cm. long by 4·5 cm. wide at base, rather exceeding the leaves, on peduncle 2–3 cm. long; lowest bracts ± 7 mm. long. *Flowers* about 1 cm. long.

Psychotria (§ Codonocalyx) **flaviventer**, sp. nov. Frutex glaber, ramulis ultimis tenuibus complanato-striatis, mox griseo-lignosis, lævibus, striatis, subteretibus. *Folia* glaberrima inter minora, chartacea, ovata, utrinque cuneata, apice subacuta, basi in petiolum brevem compressum necnon tenerum angustata; venis secundariis utrinque ± 9, cum 5–6 fere æquilongis necnon prominentibus interspersis; *stipulæ* breves tamen latissimæ, mox partibus in duobus ovatis acuminatis, apice setaceo-caudatis mox deciduis, bifidæ, parte inferiore persistente necnon lignescente. *Flores* 1–4 in axillis arcte sessiles, basi involucro brevi 3–4 *bractearum* sub-orbicularum brevissime acuminatarum mucronatarum communi nec ciliatarum basi cincti, ipsi quisque basi involucello cupulari brevi margine obscuriuscule dentato-sinuato minute ciliolato onustus; *calycis* tubo sensim globoso-ventricoso, parte inferiore aurantiaco coriaceo minute asperulo, insuper submembranaceo, striato-costulato fuscescente, lobis latis obtusis irregulariter diviso; *corollæ* subcoriaceæ lobi oblongi longiusculi subacuti, apertæ non vidi. *Bacca* obscure lobato-costata, globosa grisea.

Brasil: *Sello*!

Leaves 5–7 cm. × 1·5–3 cm., with petiole barely 7 mm. long; *calyx* 6 mm. long, exclusive of the very short lobes 4 mm. broad. *Fruit* over 7 mm. long and 6 mm. broad. This is related to *P. nuda* Wawra, but is readily distinguished by the less close venation of the leaves, the calyx-lobes much broader than long, and the long oblong corolla-lobes.

Psychotria (§ Codonocalyx) **ustericalyx**, sp. nov. Frutex glaber, ramulis junioribus valde compressis angulatis demum subteretibus furcatis, cortice lævi mox indutis. *Folia* glabra inter minora, chartacea, elliptica, utrinque acuta, apice leniter brevi-acuminata acuta, basi in petiolum brevissimum angustata, supra in siccitate fusca subtus discoloria multo pallidiora venis secundariis 10–12, intermediis nec conspicuis; *stipulæ* triangulares apice bifidæ setaceæ acuminatæ acutissimæ, caducæ demum lineâ modo interpetiolari visæ. *Flores* 1–4 in ramulorum brevissimorum axillis apicalibus dispositi arcte sessiles, *bracteis* paucis parvis valde concaveis basi circumdati gibboso-scaphoideis ovatis acutissimis, ipsi quisque basi involucello ad calycèm arcte adhærente cupulari irregulariter sinuato-dentato cinctus; *calyx* tubularis v. angustissime infundibularis nec gibbosus, dentibus latis triangularibus acutis onustus; *corolla* inter minores lobis oblongis.

Brasil: Rio de Janeiro, *Bowie & Cunningham*!

Nearly related to my *P. flaviventer* (*supra*), but at once distinguished by the tubular calyx, uninterrupted by any basal or other swelling. Allied also to *P. noxia* St. Hil., from which it differs chiefly in the scarcely-acuminate elliptical leaves, the shape of the stipules, the total absence of cilia on the involucral margins, and the entire floral involucels. *Leaves* 4–7 cm. × 1·5–2·5 cm., with petiole not 5 mm. long. *Bracts* of general involucre 3 mm. long; involucel, 3 mm. deep. Exserted part of *calyx*, 5–6 mm., width 3 mm. in the middle.

Psychotria (§ Codonocalyx) **mineirensis**, sp. nov. Frutex glaber, ramulis præsertim novellis gracillimis ruguloso-striatis, nodis sæpe valde lignoso-tumidis, junioribus valde compressis tandem subteretibus. *Folia* minuscula firme papyracea elliptice-obovata breviter acuminata apice obtusiuscula, basi leniter in petiolum brevem sulcato-complanatum cuneatim angustata, supra olivaceo-viridia subtus flaviuscula pallidiora; venæ secundariæ utrinque ca. 12, intermediis nec conspicuis; *stipulæ* demum breviter vaginantes, primo lanceolatæ apice setaceæ, mox in partibus geminis triangularibus apice aristato-setaceis bifidæ, tandem parte superiori caduca, inferiori lignescente persistente bifido lato necnon brevissimo, nonnunquam 2-aristato. *Flores* lutei 1–3 in ramulorum furcis axillisque arcte sessiles, basi *bracteis* ovatis acuminatis acutis persistentibus, liberis parvis concaveis involucrati; *calyx* basi involucello cupulari margine hic inde plus minus irregulariter setaceo-dentato arcte cinctus, in anthesi tubularis vix circa medium gibbosus, limbo striatello lobis latis brevissimis onustus, post anthesin accrescens insuper ampliatus, lobis oblongis apice rotundatis; *corolla* subtubularis insuper parum leniter ampliata, subcoriacea, lobis angustis apice crassiuscule subacutis, tubum subæquantibus.

Brasil: Rio de Janeiro, mountains about Mineira, 27 August 1815, *Bowie & Cunningham*!

A fine shrub, according to the collectors, with yellow flowers, allied to *P. involucellaris* Müll. Arg., from which it is readily separable by the relative length of calyx and corolla, and the much smaller corolla and relatively smaller involucels. *Leaves* 4–8 × 2–3 cm., with stalk rarely more than 7 mm. long; *stipular* sheath barely 3 mm. deep. *Involucel* 2–3 mm., exserted part of *calyx* 6–7 mm., of *corolla* (including the more or less erect lobes)—about 1 cm., of which the lobes occupy nearly 6 mm. Corolla 3 mm. broad at base of lobes, which are barely 2 mm. broad. The calyx grows considerably after flowering, the lobes elongating.

Psychotria (§ Mapouria) **articulicymosa**, sp. nov. Frutex glaberrimus, ramulis gracilibus novellis complanatis striatis demum subteretibus. *Folia* papyracea rhomboidea v. elliptica acuminata basi cuneata apice subacuta, venis secundariis utrinque 6, breviter petiolata; *stipulæ* subcoriaceæ ovatæ, apice obtusæ demum plus minus pectinatæ. *Flores* in cymularum longiuscule pedunculatarum paniculis laxe dispositi arcte sessiles, *bracteis* exiguis, pedunculo communi longiusculo. *Calyx* campanulatus obscuriuscule late lobatus, *ovarium* conspicue sulcatum colore fuscum coronans; *corollæ* tubus calycem vix excedens 6-meræ cylindricus, limbo patente, lobis anguste lanceolatis subacutis.

Colombia: Bogotá, Anapoirna, over 2000 ft., *Triana* 1692!

This species is related to *Mapouria sclerocalyx* Müll. Arg., native about the Rio Negro, Brazil; but the leaves of our species are much thinner in texture, the stipules more or less persistent—at least the lower part, as a sort of rigid, very short sheath—and the corolla-tube is very much shorter, relatively, than in *M. sclerocalyx*, scarcely exceeding the calyx. The *leaves* are from 9 cm. to 14 cm. long, and from 3·5 cm. to nearly 6 cm. wide; *petioles* not exceeding 5 mm. in length; *stipules*, about 7 mm. × 4·5 mm. *Peduncle* (principal, terminating ordinary branches) 3 cm. to 7 cm., or longer. *Inflorescence* about 5 cm. long, and 4·5 cm. across; longest peduncles of the small cymes, about 2 cm. *Calyx*, above ovary, barely 2 mm.; (sulcate) ovary, about 1 cm. long. *Corolla*-tube, about 2·5 mm. long; lobes 3 mm. or longer.

Psychotria (§ Mapouria) **familiarifolia**, sp. nov. Frutex nitens, ramulis quadrangularibus lævibus striatis cortice argenteo-griseo mox indutis. *Folia* glaberrima coriacea lanceolata basi in petiolum brevem validiusculum leniter angustata apice subacuta acuminata, venis secundariis subtus prominulis utrinque ca. 14; *stipulæ* oblongæ obtusissimæ caducæ. *Flores* parvi in cyma umbellata trichotoma laxiuscule dispositi, *bracteis* parvis ovato-oblongis truncatis intus pilosiusculis necnon subconcaveis. *Calyx* obtuse sulcatus necnon lobatus subcoriaceus; *corolla* extus glabra insuper infundibularis, limbo demum reflexo lobis lanceolato-triangularibus obtusis.

Colombia: *Triana* 134!

Related to *Mapouria corymbifera* Müll. Arg., from which it differs chiefly in the texture, shape, and venation of the leaves, which recall those of *M. nicaraguensis* Benth. They measure about 8–12 cm. × 2·5–4 cm., with stalk not exceeding 1–2 cm.; *stipules* 8 mm. × 3 mm. The three primary cyme-branches are 2·5–3·5 cm.

long, the whole umbel being about 9 cm. in diameter; *bracts* not more than 3–4 mm. long. *Corolla*-tube 3 mm., lobes 1·5 mm. long.

Psychotria (§ Mapouria) **halophiloides**, sp. nov. Frutex glaber ramulis complanatis. *Folia* coriacea elliptica utrinque acuminata apice obtusa, breviter petiolata, *venis* supra impressis nec conspicuis, subtus prominulis, utrinque 9 aliis nec intervenientibus; *stipulæ* crassiusculæ oblongæ apice rotundato-obtusæ demum vaginam formantes nec longe persistentem. *Flores* in cyma 5–6-chotoma densiuscule dispositi brevissime pedicellati subcorymbosa, *bracteis* paucis minutis; *calyx* parvus campanulatus limbo subintegro; *corolla* subtubularis insuper vix ampliata, tubo limbi lobos breviter oblongos obtusos 3–4-plo excedente; *antheræ* exsertæ.

Colombia: Gallego Quindio, 7600 ft., *Triana* 135!

Leaves about 7 cm. × 3 cm., with petiole 5 mm.; *stipules* 1 cm. × 5 mm. *Inflorescence* (excluding peduncle) 4·5 cm. × 6 cm. *Calyx* barely 1 mm. long; *corolla*-tube 5–6 mm. long, 2·5 mm. wide at mouth; lobes 1·7 mm. × 1 mm.

Distinguished from the Brasilian *Mapouria chionantha* Müll. Arg., its nearest ally, by the stouter flowers in laxer inflorescences which are primarily corymbose.

(To be continued.)

TWO VARIETIES OF CALAMAGROSTIS.

By C. E. Salmon, F.L.S.

1. Calamagrostis lanceolata Roth, var. pallida Lange.

When botanizing in Norfolk last July with Mr. J. W. White, we noticed near Horning Ferry some clumps of a very striking pale-flowered *Calamagrostis* which grew with an abundance of the normal purple-tinted *C. lanceolata*. The anthers, glumes, pales etc. were of a delicate pale yellow tint and the plant certainly seemed best placed under the above variety. Dr. Stapf has kindly confirmed the name. The original description (translated by Dr. B. D. Jackson) is as follows—"β. *pallida*. More slender and delicate than the species. Leaves very fine and narrow. Flowers pallid, almost colourless. Panicle relaxed, opened wide. Awns longer than in α. [the species]." J. Lange, Haandb. Danske Fl. 66, 1886.

The Norfolk plant agrees exactly with an example from Hansen, Hb. Slesv.-Holst. 808 in Herb. Mus. Brit. labelled "*Arundo Calamagrostis*, L., var. *pallida* N. (*A. canescens* Web.). Nolte Mscrpt. In Wäldern auf schattigen Plätzen; bl. Jul." It will be observed that *A. canescens* Web. is here given as a synonym of var. *pallida* and Ascherson & Graebner (Syn. Mittel. Eur. Fl. ii. 201, 1899) take up this name for the variety.

Weber's description (in Wiggers, Prim. Fl. Holsat. 10, 1780) runs—"*Arundo canescens* panicula laxissima, calyce unifloro subæquali, valvulis mucronato-aristatis. R. in torfosis prope Pagum Süfel. Nova species, quæ a priori [*A. Calamagrostis*] differt culmo simplici, debili, panicula laxa. Tota planta tenera. Calyx corollam superans. Valvulæ acute longeque mucronatæ ut fere aristatæ appareant, albicantes. Pappus longus, copiosus, corollam cingens."

C. Gaudiniana Reichb. (Fl. Germ. Excurs. 27, 1830) is another synonym given by Ascherson & Graebner (*l. c.*) as equalling *pallida*, but the figure in Ic. Germ. i. t. lxxxii, f. 150 is not very like the Norfolk form, and the original description, given below, indicates that it is a slender delicate plant having a long narrow pale panicle and very acuminate glumes with a smooth awn, and type-specimens in Hb. Mus. Brit. seem to confirm this. However, Dr. Stapf reports that a Lausanne example scarcely differs from var. *pallida* beyond that the glumes are a trifle more pointed and smoother:—

"*C. Gaudiniana* Rchb.; panicula stricta tenuissima, bracteis acuminatissimis, arista terminali brevissima lævi, pilis bracteola longioribus. *A. Calamagrostis* Gaud. e loco a nob. cit. A sequente [*C. lanceolata*] diversissima, gracillima specierum et mollis, tenera, compressibilis, ligula suprema duplo longior et angustior, panicula longissima angustissima pallens, bracteæ angustiores, longiores, arista brevior lævis.—Lausanne au bois de Sauvabelin: v. Charpentier—Jul."

2. CALAMAGROSTIS EPIGEIOS Roth, var. INTERMEDIA Grecescu.

Another Reed, gathered in Wanborough Wood, Surrey, in 1896, was determined by Dr. Stapf as *C. epigeios* c. *intermedia* Asch. & Graeb. This is founded upon *Arundo intermedia* Gmelin, which Grecescu (Consp. Fl. Roman. 607, 1898) reduced to a variety.

Gmelin's full description (Fl. Badensis, i. 266, 1805) is here given:—

"*Arundo intermedia* calycibus unifloris, panicula patente ovato-lanceolata, culmo stricto simplici . . . .

"Differt a præcedenti specie [*A. epigejos*]; Habitu præsertim. *Culmo* demissiore quatuor pedali, strictiore, 4–5 articulato, infra paniculam magis aspero. *Foliis* ex viridi-canescentibus, margine magis retrorsum asperis, secantibus. *Panicula* florente ovato-lanceolata, e viridi-canescente. *Pedunculis* duplo brevioribus, patenti-erectiusculis. *Glumis* calycinis canescente-viridibus, margine et apice dilute rubellis, perfecte æqualibus, mucronatis. *Corollæ* valvula exteriore infra dorsi medium semper aristata: *Arista* longiore. *Pappo* in basi corollæ copioso, calyce sublongiori.

"Nota. Habitus a præcedente et sequente specie [A. *Calamagrostis*] quam maxime diversus, dictitat separationem . . . .

"Affinis Arundini Leersii f. Calamagrosti Arundo. Roth. fl. germ. 2. p. 88. a qua differre videtur: culmis non binodibus."

Ascherson & Graebner (Syn. Mittel. Fl. ii. 215, 1899) give but the following very short description of their c. *intermedia*—"Outer-glumes green, with narrow violet border. In similar places as the preceding [B. *Reichenbachiana*]."

It is for monographers of the genus to weigh and calculate the real value of the plants noted above and to decide whether they are stable varieties or, as would appear from a superficial examination, merely colour "states."

SHORT NOTES.

Sedum Drucei (p. 212). My opinion having been quoted by Mr. Druce in support of the distinctness of this plant, I should like to state the facts of the case. In 1910 I was at Agnetendorf in the Riesengebirge. I had Garcke's *Flora* with me, but in the absence of a dictionary could not read it. Among the plants observed was a *Sedum* on the walls which I did not think was *S. acre*. I found that of the group Garcke only gives it and *S. sexangulare*. As I could not tell whether it agreed with the description of the latter (which I did not know), I thought no more about the matter (except that in the meantime I had seen *S. sexangulare* and realized that my plant must have been *S. acre*) until 1912, when I was introduced to Mr. Druce at a meeting of the International Phytogeographical Excursion at Hayling Island. In the course of conversation he told me that it was supposed that the British *S. acre* was not identical with the Continental plant, whereupon I said that this perhaps explained why I had thought the Agnetendorf *Sedum* was something I did not know. But I considered the matter equally likely to be explained by the fact that I had never given more than the most casual glance at the British *S. acre*. I was surprised to read in the B. E. C. Report the statement quoted by Mr. Praeger.—A. J. Wilmott.

Botanists and horticulturists are under an obligation to Mr. R. Lloyd Praeger for his work on *Sedum*, and particularly for his illuminating account of *S. Drucei*. Especially interesting is the result of his cultivation of *S. acre* from various British, Irish, and Continental sources, and that he found it impossible to separate these into groups. I agree that several European species of *Sedum* display a wider range of variation than is found in *S. acre* (including *Drucei*); and it would be well if every British and German botanist would note Mr. Praeger's last paragraph, where he says "No doubt it will be shown eventually that in the case of a large number of our plants the British forms differ slightly from Continental types; it would be surprising if this were not so." This important point was alluded to by several writers in the *New Phytologist* on the International Phytogeographical Excursion (1911). In the opinion of many such variations are only worthy of varietal rank; and some of us who have botanised much on the Continent as well as at home consider it unfortunate that Prof. Graebner has separated as a distinct species the British *Sedum acre*. If this be taken as a precedent other new specific names, equally regrettable, may follow. I do not remember gathering *S. acre* in Germany, but have frequently examined and gathered it in France and Switzerland; and that without observing any great difference in it from the British plant, which itself varies naturally according to soil and situation, and occasionally simulates *S. sexangulare*.—H. S. Thompson.

A Large Moth-Mullein (*Verbascum Blattaria*). In August I took the following particulars of a very large specimen of *Verbascum Blattaria*, 7 ft. 6 inches high, growing in long grass in a neglected garden in Clifton, Bristol. I estimated that the plant produced at least 250,000 seeds, after allowing for 96 apparently unfertile flowers, 56 of which were on the main stem: all but one of the lowest flowers on this stem were barren. When these plants produce so many seeds it is strange that usually they appear at such uncertain intervals and in such small quantities—often I believe singly, as in this case, or in twos and threes—on walls, banks and waste places. This specimen had ten branches; the longest was 3 ft. 6 inches, with 140 flowers; five branches had about 80 flowers each, four had 65 each, and a subsidiary one had 30 flowers: total 830 flowers. Deducting 96 unfertile flowers, we arrive at a total of 734 capsules formed. I calculated that the capsules averaged 350 seeds each, which gives a total of over 250,000 seeds. Several of the longest leaves, including those of the basal rosette, were 9 or 10 inches in length; and 34 leaves were over five inches long. These larger leaves were all crenate-lobate. The middle and upper leaves tapered more and more. The flowers, opening very few at a time, were an inch in diameter, pale cream with a suggestion of pink; and the two upper corolla-segments were invariably blotched with pale purple at the back (I find no mention of this anywhere)*: it is probably these two petals which give the purple-pink colour to the flat buds. The filaments are clothed with beautiful purple hairs. The pedicels were mostly longer than the calyx, solitary, and glandular like the whole upper portion of the plant. There was another Mullein a few yards off in the grass—a stout, unbranched *V. virgatum*, with bright yellow blossoms 1¼ inch across. The pedicels were more fascicled, much shorter than the calyx, and more glandular than in *V. Blattaria*. Besides the more densely flowered raceme the lower leaves were quite different, being bluntly serrate, much less crenate, not shiny, and lighter in colour, and the upper leaves were slightly decurrent. In habit and colour this species is nearer *V. nigrum*. The hairs of the filaments are purple in all three species, whereas in *V. Lychnitis* they are whitish.—H. S. THOMPSON.

EUGLENA RUBRA IN BRITAIN. I had gone out to get for Prof. Bayley Balfour some *Hydrocharis Morsus-ranæ* which is found in a pond just outside the Preston Borough Boundary, when I noticed that the surface of the water was covered with a rusty scum. Some of this was submitted to Professor G. S. West of Birmingham who writes, "The organism is *Euglena rubra* Hardy, which has been found in Central Europe and Australia: I cannot be certain of any British records." The pond in question is one of a group, but the *Euglena* was confined to that in which the *Hydrocharis* is found, with the exception of one *very* small patch in a pond about six hundred yards away: it is probable this has been carried there by moor-hens which breed in these ponds. I shall be interested to hear if there are any other British records.—W. HY. HEATHCOTE.

VACCINIUM IN LINCOLNSHIRE. A species long believed to be lost, *Vaccinium Oxycoccos*, was found again in the parish of Appleby on June 19. Another species, which has never been recorded for

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* Since this note was written, I have seen in the Botanic Garden of the University of Bristol a yellow-flowered Moth-Mullein with similar purple blotches at the back of the two upper corolla-segments.

Lincolnshire, *V. Myrtillus*, was discovered by me in Broughton parish on the 14th of July. Both have been verified and the surrounding flora noted by the Rev. E. Adrian Woodruffe-Peacock, who says that the aridity of the county had made it practically hopeless to hunt for the Bilberry.—A. N. Claye.

REVIEWS.

A Dictionary of Plant Names. By H. L. Gerth van Wijk: published by the Dutch Society of Sciences at Haarlem. Vol. ii (Index). Large 4to, pp. 1696, xxxiii. The Hague: Martinus Nijhoff, 1916.

This handsome volume is the completion of the work the earlier portion of which was noticed in this Journal for 1911, p. 236, to which it forms an index. The first portion contains the accepted Latin names arranged alphabetically, under each of which are grouped the vernacular equivalents in English, French, German, and Dutch; in the Index the converse system is followed, so that we have in one alphabet a complete list of vernacular names so far as they were known to the compiler, whose industry demands all praise.

The book is admirably printed; great care must have been exercised in the reading of proofs, for the number of misprints—we are referring only to the English names—is astonishingly small. It would, we think, have been well if the Latin equivalent for each name had been printed in italics: the use of the same font for both sets of names does not tend to clearness. Convenience would have been increased and time saved if, in the Latin equivalents, the specific names had been given as well as the generic; as it is, the former are indicated by the number which the plant occupies under its genus in the earlier portion,—e. g. "hawdod v. Centaurea 10"—to which it is thus necessary to refer on every occasion. It is true that this would have added to the size of the volume, already a large one; but the space required could to a large extent have been saved by restrictions which would not have interfered with the usefulness of the book. In our former notice we pointed out that mere translations were far too numerous, but it was not until we saw their prominence in the Index that we realized how largely they encumbered the work. It may of course be urged that as they occur in the book they should appear in the index; but many now appear for the first time which can in no sense be regarded as genuine names, being indeed obviously mere book-creations which never have been and never will be in actual spoken use: of these "Thlaspi bourse à pasteur" may be taken as an example. Among useless entries those which appear under "common" may be taken as typical: no one would think of speaking of the "*common* chickweed" nor of "*common* lavender," and the prefix is extended to names which themselves would never be used—*e. g.* no one would refer to *Hedysarum coronarium* as "common hedysarum"—a name whose presence in the book is due to the inclusion of the numerous similar "English" names given by Nemnich in his *Allegemeines Polyglotten-lexicon*—a work quite useless for the compiler's purpose. If only Dr. Gerth van Wijk had consulted the surviving compiler of the *Dictionary of English Plant Names*, or the *English Dialect Dictionary*, he might have saved himself much unnecessary labour and his work would have given a far better representation of English names.

Of course a book of this kind must always from its nature be incomplete, but as the compiler was making additions to the books quoted, of which he gives a list, we are sorry he did not consult those mentioned in our former notice, which would have enabled him to add a large number of names in actual use to his enumeration. As it is, however, he has given us the most comprehensive collection of plant-names in existence, and one which cannot fail to be of service to those concerned with popular nomenclature.

Llysieulyfr Meddyginiaethol a briodolir i William Salesbury [*a Herbal attributed to William Salesbury*] *edited with an Introduction and Notes by* E. STANTON ROBERTS, B.A. 4to; cloth, pp. lviii, 275. Liverpool: Hugh Evans & Sons, 1916. Price £1 1*s*.

WILLIAM SALESBURY, or Salisbury (1520?–1600), of whom a full account is given by Mr. D. Lleufer Thomas in the *Dictionary of National Biography* (I. 196–200: 1897) was eminent as a lexicographer, but is chiefly known in connection with his translation of the New Testament into Welsh. "In his later years," Mr. Thomas tells us, "he wrote a Welsh Botanology, a transcript of which, made in 1763 from the original manuscript, now lost, was recently in the possession of John Peter (Ioan Pedr, of Bala)," who published an account of it in *Y Traethodydd* for 1873 *. After Peter's death, in 1877, it was acquired by the University College of Wales at Aberystwith, whence it passed into the National Library of Wales: it has now been published in a handsome quarto volume, at the expense of the late Mr. John Morris, of Llansannon, to whom it is fittingly dedicated.

The editor, Mr. Stanton Roberts, has done his work exceedingly well, and has spared no pains in elaborating the Herbal. His Introduction of fifty pages gives, in four chapters, the history of the MS., an account of the sources from which it was compiled, a discussion of its authorship, and another as to the identity of the "Syr Thomas ap William" who borrowed Salesbury's manuscript in 1597. Mr. Roberts agrees with Peter in identifying him with Syr Thomas Wiliems of Trefriw—"the Syr prefixed to his name was an ecclesiastical title"—who was a contemporary and neighbour of Salesbury, and "perhaps best known as the author of the *Dictionarium Latino-Cambricum*, which he completed in 1607." The full and frequent references to plants in this work, and his allusions to sixteenth century botanical authors, show that he was well acquainted with the botany of the period. Mr. Roberts quotes numerous parallelisms which "seem to show that [he] must have used Salesbury's *Llysieulyfr* in compiling his Latin-Welsh lexicon."

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* This article is summarised by Mr. Thomas in the account of Welsh Botany which forms Appendix B. of the Report of the Royal Commission on Land in Wales (1896) and was reprinted in this Journal for 1898, pp. 10–23: the passage relating to Salesbury is on p. 12. Mr. Thomas says that Peter (1833–77) "was himself an enthusiastic botanist," but we have no evidence in support of this statement.

The chapter which discusses the authorship of the Herbal is an exceedingly careful piece of work, containing evidence drawn from the book itself connected with places named therein and a careful comparison of the orthography with that of Salesbury's undoubted work. For it must be borne in mind that the definite statement as to authorship made in the D.N.B., supported though it is by a note in the MS. which is reproduced in facsimile as a title-page to the book, is not to be accepted without question, although the investigations by Peter and their still more searching extension by Mr. Roberts point almost certainly to this conclusion.

For a knowledge of the nature of the Herbal we are indebted entirely to Mr. Roberts, as the work itself is written in Welsh and there is no English translation. The two chief authors to whom the writer was indebted for much of his subject-matter are Leonhard Fuchs (whose name he writes "phwchsiws") and William Turner, whom he describes as "gwr mawr ei ystryw ar adnabod Llysie" (a man of great skill in recognising plants). From the *De Historia Stirpium* of the former the greater part of the Welsh text has been translated, and the order of the descriptions is followed: from Turner he took "the identification, the English names, and the habitats of many of the plants." "The only portions that appear to be original additions are the Welsh names of the plants described, many of which, no doubt, he got from Welsh manuscripts; some references to places where he had found certain of the plants growing; a few personal allusions, which are valuable because of the light they throw on the question of the authorship of the work; and an occasional bit of folklore, such as that about the Welsh custom of placing the Mugwort [*Artemisia Absinthium*] under the eaves of houses on Midsummer's Eve." Mr. Roberts (pp. xxvii–xix) has some interesting remarks on the Welsh names, the identification of which in the notes is not meant to be final, in view of the uncertainty and confusion in their use and the inadequate and ambiguous nature of the descriptions in the *Llysieulyfr*.

The text is accompanied throughout by numerous explanatory notes and by copious quotations from Fuchs and Turner, with occasional references to other books, of which a list is given: there is also an excellent index and glossary. The book is in every respect a monument of painstaking scholarship.

BOOK-NOTES, NEWS, ETC.

An interesting correspondence has been appearing in the *Garden* relating to the scentlessness of "Musk" (*Mimulus moschatus* L.). This scentlessness has become general, but a correspondent writes that a plant appeared in a cottage garden (place not stated) from which cuttings have been taken and eagerly applied for. "The first application was from Kew Gardens, who wrote that they had tried everywhere, even sending as far as Vancouver, where the plant grown in gardens is supposed to have been originally obtained; but the plants received from there were as odourless as their own." A New Zealand correspondent writes from Wanganui in the issue for Aug. 1: "Many years ago I was for a short time up in the Sierra Nevada Mountains in Southern California, and found the common Musk and other of the larger Mimuli abundant in wet spots. I also found, what is well known in that part, at any rate, that only some plants of *Mimulus moschatus* in the native state are scented, and that most are not scented. There are all stages between scentless and strongly scented, but strongly scented is the exception. I have had the common Musk growing in a low, shaded place in the garden, where it has been taking care of itself entirely, except for weeding, and it seems as sweet as it ever was, but, of course, is not reproducing itself from seed. Did it do so, I have no doubt it would revert to the scentless, wild form, as I believe that predominates."

THE *Transactions of the British Mycological Society* for 1916 (vol. v. part 3, 7 July, 1917) contains as usual a varied amount of information relating to our fungi, and is indispensable to the British mycologist. Mr. Ramsbottom contributes a summary of the papers published during 1916 on fungus cytology, and biographical notices of John William Ellis (1857–1916), John William Hart (1887–1916), Charles Crossland (1844–1916), and George Edward Massee (1850–1917)—the last practically identical with that published in our last issue, the MS. of which, it seems right to say, had been for some time in our possession. Mr. Ramsbottom also collaborates with Miss Lorrain Smith in descriptions of new or rare microfungi, among which are included those published by Mr. W. B. Grove in this Journal. Mr. Carleton Rea reports on the New Forest foray of the year, with a complete list of the fungi observed, and has a paper on "New or Rare British Fungi," in which are described as new *Marasmius pruinatus*, *Cortinarius fuscotinctus*, and *Lasiobolus macrotinctus*, of which coloured figures are given. Mr. E. W. Swanton summarizes the work of the year in various countries; Dr. W. T. Elliott contributes observations on the assimilation of fungi by *Badhamia utricularis*; and Messrs. Somerville Hastings and J. C. Mottram summarize the evidence as to "The Edibility of Fungi for Rodents," illustrated by five plates. Miss Jessie Bayliss Elliott in the course of "Studies in *Discomycetes*" describes and figures a new genus, *Acleistia*. The printing is clear and good, though the black type for headings of papers is somewhat aggressive: when a new volume is begun we would suggest that the headings of the pages, at present blank save for the number, should be utilized for information concerning the subjects treated below.

THE Report of the Botanical Exchange Club for 1916 consists of two parts—the first by the Secretary, Mr. G. C. Druce; the second by the "Editors and Distributors," Messrs. W. H. Pearsall and D. Lumb. Both contain numerous notes of interest; in the former besides these, which are often somewhat discursive, is a summary of the botanical literature of the year, mostly relating to British botany; numerous additions are, as usual, made to the list of casuals, some of them swept up from early records. As we have not received copies for review, we are not called upon for a detailed notice of the Reports. We note, however, that this Journal is somewhat extensively laid under contribution: we do not object to this in reason, but we think some limit should be observed—*e. g.* it is hardly fair so to abstract (p. 402) Mr. A. B. Jackson's paper on *Barbarea* as to render consultation of the original almost unnecessary. In a special supplement, which "only carries with it [his] own views and is not printed at any expense to the members," Mr. Druce indulges in his favourite game of "new combinations," finding fresh scope for his ingenuity among African and Australian plants. We have more than once expressed the opinion, which is, we believe, entertained by all systematic botanists, that this practice, which appears to be based upon book-work and shows no evidence of acquaintance with the plants themselves, is not in accordance with recognized botanical custom, however gratifying it may be to personal ambition. Mr. Druce also gives an interesting and very full account of John Goodyer, in which he has brought together the various references to and quotations from this excellent botanist which have appeared in Parkinson's *Theatrum* and elsewhere, and describes his library, bequeathed to Magdalen College, and MSS.

THE *Garden* of June 30 contains the following item of folk-lore, corresponding with that which in this country is associated with *Sambucus Ebulus* and *Anemone Pulsatilla* in their supposed connection with the blood of the Danes. It is narrated by Father Nicholas Velimirovic, of Belgrade, "whose love for Serbian flowers and folk-lore amounts almost to a passion":—"In June, 1389, the Field of Kossovo was thickly inhabited, and a joyful people sang with a choir of nightingales among the white Peonies. Many rich villages, beautiful white towns, stony churches, pious nobles, gorgeous merchants, exporting gold and silver from a neighbouring mountain of the field; a lofty army, many visitors from Byzantium and Venice admiring a youthful Christian nation—so it was. But the storm came. A storm with hail. And the storm with hail was the Turk, the Unfaithful. It was not the first struggle, but the last and decisive one. The first was under King Dushan, who proceeded with the Serbian Crusaders to defend Constantinople, the Orthodox Sancta Sanctorum, and sacrificed his life; the second was under King Vukashin (1371), who fought near Adrianople, and gave his life for the Cross; the third was at Ploenik, under the victorious Voivode Milosh. In June, 1389, was the last and decisive one. On that twenty-eighth day of June rain was falling as the two splendid armies met, the one fighting for Christ, the other one against Christ. The white Peonies were bathing in the warm rain. The rain stopped in the evening, and the field was red with blood. The Serbians made the supreme sacrifice for Christ: the King and the nobles, the dukes and the whole army laid down their lives for the greatest ideal. The Serbian Kingdom perished, and the Serbian material glory vanished. But Christ remained with the Serbs, Christ and the glorious story of the supreme sacrifice on the field of the white Peonies. White? No. No human eyes ever since saw them *white*. From the following day of the battle they became *red*, and all the following generations of Peonies grew red; not one made exception. Some say they grew red from the blood of the heroic Crusaders; some say they grew red because they blushed at seeing the Turkish devastation of the field and their oppression of the Christian people; some say they grew red as a symbol of suffering, with hope of resurrection for the oppressed ones. But the first interpretation prevails among the Serbian people." The legend adds that when the freedom of Serbia has been secured, the Peonies will again become white.

THE *Journal of Genetics* for July contains a paper on "Types of Segregation" by Caroline Bellew, which is mainly concerned with "certain abnormalities in the development of anthers, of flower-colour and of variation in *Campanula carpatica* and related forms": the paper is illustrated by one of the excellent coloured plates for which the *Journal* is distinguished. Mr. S. Ikeno adds a note to his former paper on variegated races of *Capsicum annuum*.

THE *Irish Naturalist* for August contains a paper by Mr. Groves and Canon Bullock-Webster on *Tolypella nidifica* Leonh. in Ireland, the occurrence of which has hitherto been regarded as somewhat doubtful. "The most satisfactory specimens examined are from a lagoon north of Wexford Harbour, collected by the Rev. E. S. Marshall in June 1895."

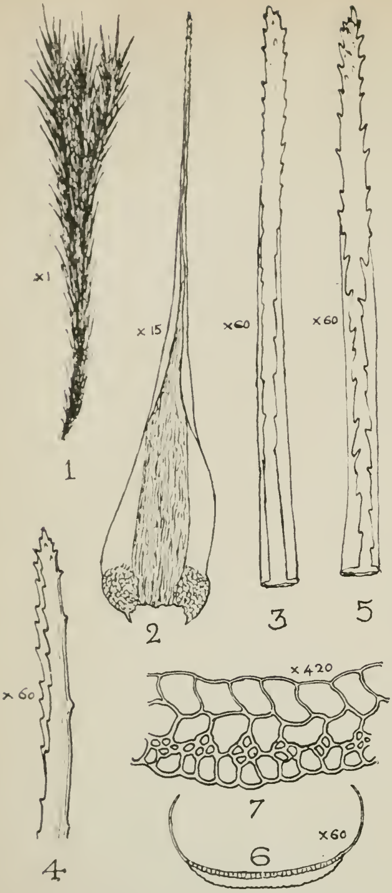
MR. MUNRO BRIGGS SCOTT, a native of Fifeshire, was born on 29 April, 1889. He studied in the University of Edinburgh, where he graduated M.A. and B.Sc., showing a marked predilection for Botany, in which he was a pupil of Professor Bayley Balfour, F.R.S. After graduation Mr. Scott became a schoolmaster but, preferring botanical work, he competed for and secured an assistantship in the Herbarium attached to the Royal Botanic Gardens, Kew, on 1 August, 1914. Having attested for military service, Mr. Scott joined the East Surrey Regiment in February 1916, but was shortly thereafter transferred to the Suffolk Regiment, promoted lance corporal, and recommended for a commission. This he gained in November 1916, distinguishing himself in the examination, and was gazetted to the Royal Scots Regiment. After obtaining his commission Mr. Scott married Miss F. M. Forbes, M.A., of Pitlochry, Perthshire, and on 9 January, 1917, he joined the British Expeditionary Force in France. During an attack on 12 April last he was wounded and, while his wound was being dressed, was instantaneously killed by a high-explosive shell. A man of great capacity, as modest as he was painstaking, his colleagues at Kew had anticipated for Mr. Scott a successful future. The public service by his death has been deprived of the assistance of a useful and promising member.—D. P.

THE *Gardeners' Chronicle* of Aug. 18 and the *Garden* of Aug. 25 contain notices (in each case accompanied by a portrait) of the late CHARLES THOMAS DRUERY, F.L.S., who died at Acton on Aug. 8. His name has been for many years associated with the study and production of varieties of British Ferns, on which his book, *British Ferns and their Varieties* (1910). is the standard authority; he had previously published a volume on *Choice British Ferns* and a *Book of British Ferns*. His study of these forms led to the discovery of apospory in Ferns, to which he drew attention in papers read at the Linnean Society in 1884 and published in the Society's *Journal* (xxi. 354–60). The plants on which his observations were chiefly based were varieties of two species—*Athyrium Filix-fœmina*, var. *clarissima* and *Polystichum angulare*, var. *pulcherrimum*. Druery was for many years connected with the British Pteridological Society, whose *Gazette* he founded and edited: he was also a prominent member of the Floral and Scientific Committees of the Royal Horticultural Society, which awarded him its Victoria Medal of Honour.

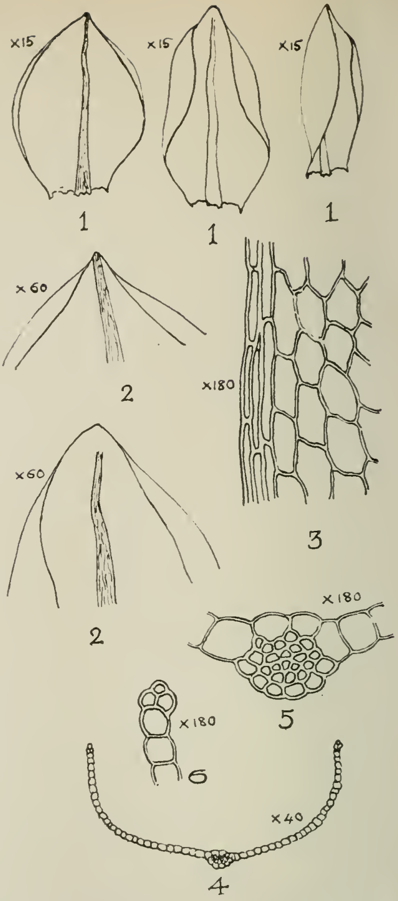
THE *Kew Bulletin* issued in July (no. 2, 1917) contains a monograph of the British species of *Phomopsis*, a genus "hitherto ignored by all British mycologists," the separation of which from *Phoma* was suggested by Saccardo: eighty-eight species are enumerated, some of which are "excluded for the present from the British List": four are new. Mr. Rolfe clears up the history of the Strawberry-Raspberry (*Rubus illecebrosus* Focke), a Japanese species with a somewhat copious synonymy, and also describes some new orchids; he also gives an account of a collection of drawings made by Mrs. Ross, of Poggio Gherardo, Florence, which has lately been acquired for Kew.

IN *Rhodora* for July Mr. C. A. Weatherby writes on *Impatiens biflora*, which he says produces an unusually interesting series of colour variations, in range of hue very similar to those of the garden "nasturtium," *Tropæolum majus*. The "typical and common form" he describes as having orange flowers with more or less numerous, usually crimson, spots. He distinguishes forms to which he gives the names *citrina*, *albiflora*, and *immaculata*, the characters of which are indicated by their names: there is also a form *Peasei*, which has pink flowers spotted with red: the forms, he says, "show abundant ability to maintain themselves." It would be interesting to know whether similar variation has been noticed in England.

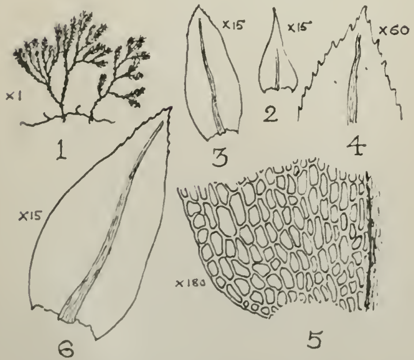
IN the course of a story, "Below Zero," in the *Windsor Magazine* for July, Mr. Fred. M. White tells of one Lord Rayburn who had a "magnificent collection of orchids." The "gem of the collection" was "of the class *Gynandria Monandria*—a marsh orchid from South Africa, and the only one of its kind yet discovered." "I prefer them," said his lordship, "to the *epiphytes*, exquisite as they are: and that, of course, is a *cypripedium*." This allocation of the plant is hardly as obvious as Lord Raynor implies, as it is described as having "a long spike of bloom that shot upwards a foot or more in height in a series of shaded mauve blossoms with centres and cups graded away to the hue of virgin gold: the exquisite mass clung to the stem and trembled like a cloud of butterflies." Later on however the orchid is referred to as "the priceless *Gynandria Monogynia*," so it may be presumed that its owner was somewhat doubtful as to the genus, and wisely confined himself to its position in the somewhat obsolete Linnean classification.


x1
1
x15
2
x60
3
x60
5
x60
4
x420
7
x60
6

C. setifolius *var.* intermedius.


x15
1
x15
1
x15
1
x60
2
x180
3
x60
2
x180
5
x180
6
x40
4

B. pallens *var.* euryphyllum.


x1
1
x15
3
x15
2
x60
4
x15
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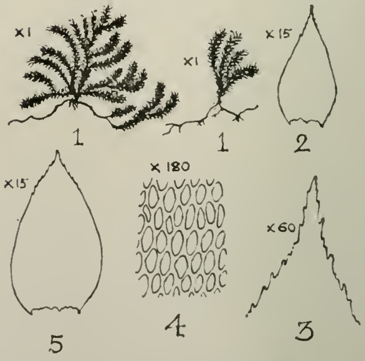
x180
5

P. alopecurum *var.* aridulum.


x1
1
x1
1
x15
2
x15
5
x180
4
x60
3

P. gracile *var.* harlecense.

H. G. Jameson, del.

NEW VARIETIES OF BRITISH MOSSES.

NEW VARIETIES OF BRITISH MOSSES.

By D. A. Jones.

(Plate 549.)

Campylopus setifolius Wils. *var.* intermedius, var. nov.

In November 1900 I gathered a *Campylopus* by the side of a stream in Cwm Mawr, Harlech, which, while possessing some of the characteristics of *C. flexuosus* Brid., showed also some resemblance to *C. setifolius* Wils. After further examination it was sent to the Moss Exchange Club as an unnamed variety of *C. flexuosus*. Mr. R. H. Meldrum, the referee, agreed that it belonged to that species, and that it did not fit with the descriptions of any of the named varieties, but considered that it was inadvisable in so variable a species to add to the number of named forms. In March last I visited the same district and found the plant under better conditions and in greater quantities on the stony ground along the shore of Llyn Eiddew Mawr. It distinctly resembles *C. setifolius*, which occurs in the same Cwm, as it has the glossy appearance and slender habit with long, setaceous, rigid, denticulate leaves so characteristic of that species. The upper leaves, however, are slightly flexuose. The nerve is generally broader than in *C. flexuosus*, although in some of the lower leaves it is quite as narrow. In section, also, the anterior cells are much larger than the Deuter and therefore much more like those of *C. setifolius*, as mentioned by Mr. H. N. Dixon. The basal cells are laxer and with thinner walls than is usually found in either of the two species. The auricles are inflated and hyaline, showing a tendency to be coloured in the inner part towards the base of the nerve. I regard this plant as intermediate between *C. setifolius* and *C. flexuosus* with a nearer approach to the former.

A beautiful form approaching this variety occurs on damp rocks in Cwm Bychan, Harlech, where I gathered it in the company of Mr. E. Cleminshaw in April 1915. The stems are tall with glossy, falcate leaves. The upper leaves are distinctly flexuose and in nerve section and basal areolation are nearer *C. flexuosus*; the leaves, however, are more denticulate than is usual in that variable species. A similar form has been found by Mr. J. Hunter at South Barrule, Isle of Man. I would label these two plants, *C. flexuosus* Brid., approaching *C. setifolius* var. *intermedius*:—

Campylopus setifolius Wils. var. *intermedius* mihi.

Cæspites alti, lati, extensi, nitide saturato-virescentes; plantulæ paullo minus graciles, infra exigue radiculosæ; folia minime conferta, erecto-patentia, recta, madore rigida siccitate flexuosa, basi nitenti, superiora haud tam longe setacea; margo pro maxima parte tubularis, parte superiori, sed non tam longe ab apice, denticulatus, vix tamen serratus; costa lata, dorso superius vix spinuloso-denticulato; cellulis ventralibus quam eurycystis in sectione transversali multo majoribus; auriculæ grandes vitreæ parte interiore nonnunquam coloratæ; cellulæ basilares laxiores, minus distinctæ, parietibus tenuioribus.

Hab.—In locis humidis saxosis prope lacum Eiddew Mawr; prope Cwm Bychan; in comitatu Merioneth.

BRYUM PALLENS Sw. var. EURYPHYLLUM.

Bryum pallens Sw. occurs frequently along the western sea-coast of North Wales, where its reddish tufts make it a prominent moss on our sandy flats. A remarkable form grows among the sandy detritus along both banks of the River Glaslyn: this ground is subject to periodical inundation during high tides or heavy rains. It has a considerable resemblance in its leaves to *B. calophyllum* R. Br., but the lower leaves on some of the stems are distinctly typical of *B. pallens*. Mr. Wheldon suggests in the *Report of the Moss Exchange Club* for 1917 that it may possibly be *B. pallens* × *calophyllum*, but I have seen no evidence of hybridity among the *B. calophyllum* which was found growing and fruiting freely in the same spot by the Rev. P. G. M. Rhodes last August. The leaves are large, sometimes as broad as long, very concave, obtuse, strongly recurved and less decurrent. The cells are also much smaller and often subquadrate at margin in few narrow rows forming less distinct border, occasionally bistratose. The nerve is thick, excurrent in a short mucro or vanishing at or just below the apex. Hitherto only male plants have been found. The typical form of *B. pallens* is scattered over the same area:—

Bryum pallens Sw. var. *euryphyllum* mihi.

Cæspites laxi molles læte-virescentes, rubore quodam suffusi; caules brevissimi, paucis ad basim radiculis; folia distantia, siccitate minus crispata, majora, nonnunquam tam lata quam longa, admodum concava, obtusiora, valde recurvata, minus decurrentia; cellulæ multo minores, sæpe subquadratæ, parietibus crassis, seriebus paucis marginem versus limbam distinctam exhibentibus; costa valida, in mucronem brevem excurrens, aut in apice vel immediate subtus desinens. Masculinæ plantulæ tantum inventæ.

Hab.—In detritu arenoso sæpe inundato prope mare juxta flumen Glaslyn, in comitatibus Carnarvon et Merioneth.

POROTRICHUM ALOPECURUM Mitt. var. ARIDULUM.

The two marked forms of *Porotrichum alopecurum* Mitt. (*Thamnium alopecurum* B. & S. auct. plur.) mentioned in the *Handbook to British Mosses*, occur in North Wales—the terrestrial with non-complanate branches, curved, robust and with more spreading leaves; and also the rupestral form with distinctly complanate branches, straighter, more slender and flagelliform with smaller appressed leaves. A plant which grows on dry rocks at Harlech differs from the two forms above mentioned; much resembling *Eurhynchium myosuroides* Schp. in size and appearance. It forms extended, prostrate tufts on the surface of the rocks and does not show the dendroid habit of the type. The secondary branches are neither curved nor complanate. The lower stem leaves are exceedingly small, with the nerve shorter, sometimes very faint, almost wanting. The branch leaves are narrower, crisped when dry, the cells rounded or subquadrate to the base and the nerve occasionally bifid. Mr. Dixon has sent me a remarkable form from cliffs by a waterfall, near Erwood Bridge, Brecon, South Wales. It is a larger plant and bears a closer resemblance to the type in all its parts. He has also drawn my attention to two varieties of *P. alopecurum*, which have already been described. One, mentioned by Roth as var. *cavernarum*, was gathered by Schliephacke in the Hartz Mountains and described by him as a weaker form from calcareous rocks with narrower and generally more pointed leaves. The Harlech plant grows on dry Cambrian rocks, which contain no lime, and the leaves do not answer to that description. The other was described by Schiffner from a specimen gathered in Persia and named var. *corticolum*. This variety resembles *myosuroides* Schp. in size and habit: it is not glossy, but in structure is like the type form. My new variety has not the corticolous habit and further differs from the type in the branching and stem leaves. *Thamnium mediterranean* resembles the new variety in size, but has very complanate leaves :—

Porotrichum alopecurum Mitt. var. *aridulum* mihi.

Plantula forma typica multo brevior *Eurhynchio myosuroidi* assimilis tum habitu tum colore. Cæspites molles, prostrati, sat extensi, læte luteo-virescentes, subnitidi; caules secundarii subdendroidales, nonnunquam flagelliformes, ramis nec curvatis nec complanatis; folia caulina admodum parva, acuminata, costa breviori interdum fere obsoleta; folia ramealia typicis multo minora, siccitate crispata, typicis forma consimilia; cellulis usque ad basim magis uniforme rotundatis aut subquadratis, costa validissima raro furcata.

Hab.—Ad saxa silicea arida prope Harlech, in comitatu Merioneth, April 1913.

PTEROGONIUM GRACILE Swartz var. HARLECENSE mihi.

The genus *Pterogonium* is represented in the British Isles by one species only, viz. *P. gracile* (*P. ornithopodioides* (Huds.) Lindb.). This is a very distinct moss, with sub-dendroid stems and crowded branches curved to one side, and occurs in about 62 vice-comital areas. In Merioneth it is frequent in woods and is found both on trees and rocks. It fruits not infrequently with us, the rupestral plant being rather more fertile than the arboreal one. A very marked form growing with the type occurs on trees in Llechwedd Woods, Harlech, which has been recognized for some time by British bryologists as distinct, though it has never been formally described, and I think deserves varietal rank. It is extremely slender with long, julaceous and flagelliform branches. The leaves are much smaller, more acuminate, the margins scarcely less serrate, and the areolation laxer. Mr. Dixon refers in the *Handbook to British Mosses* to a var. *cavernarum* of this species, described by Pfeffer, the leaves of which have fewer serrations than the type. The Merionethshire form is fairly constant and is distributed along the western border of the county in several localities. Mr. Meldrum has also found the same variety in Perthshire :—

Pterogoninm gracile Swartz var. *harlecense* mihi.

Caulibus admodum gracilibus; ramis longis, julaceis, flagelliformibus; foliis valde parvis, angustioribus, magis acuminatis. vix minus serratis; cellulis laxioribus aliquanto majoribus.

Hab.—Ad arbores, in silva montana, Llechwedd nuncupata, prope

Harlech 1878; prope Llanfrothen; prope Dolgelley, etc., in comitatu Merioneth, Cambria septentrionalis, leg. D. A. Jones: prope litora lacus Earn, juxta Lochearnhead, in comitatu, Perth, Scotia, 1898, leg. R. H. Meldrum.

The above varieties have been seen by Mr. H. N. Dixon, who writes:—"The four varieties are all well marked and should stand." I am indebted to Mr. Dixon and the Rev. P. G. M. Rhodes, for assistance in drawing up this paper, and to the Rev. H. G. Jameson for the excellent plate.

EXPLANATION OF PLATE 549.

Campylopus setifolius var. *intermedius.*—1. Plant. 2. Leaf. 3. Apex of do. 4. Back of apex. 5. Apex of leaf of type. 6. Section of leaf. 7. Central portion of do.

Bryum pallens var. *euryphyllum.*—1. Leaves. 2. Apex of do. 3. Cells at margin. 4. Section of leaf. 5 and 6. Central and marginal portions of do.

Porotrichum alopecurum var. *aridulum.*—1. Plant. 2. Lower stem leaf. 3. Branch leaf. 4. Apex of do. 5. Cells at base of do. 6. Leaf of type, for comparison of size.

Pterogonium gracile var. *harlecense.*—1. Plant. 2. Leaf. 3. Apex of do. 4. Cells of upper part. 5. Leaf of type for comparison of size.

NOTES ON JAMAICA PLANTS.

By WILLIAM FAWCETT, B.Sc., & A. B. RENDLE, F.R.S.

(Continued from p. 38.)

PICRODENDRON.

IN elaborating the *Simarubaceæ* for the Flora we have considered this genus, which is doubtfully referred to this family by Bentham & Hooker and subsequently by Engler in the *Pflanzenfamilien*. The genus was founded by Planchon in his revision of the family (in Hook. Lond. Journ. Bot. v. 579, 1846), on material collected by Macfadyen, which supplied only vegetative characters and fruit.

Macfadyen (Jam. i. 225, 1837) had referred the plant to *Rhus arborea* DC., and Planchon adopts DeCandolle's species name under his own new genus, citing the new species as *Picrodendron arboreum*.

Planchon had overlooked the previous description of the plant by Linnæus as *Juglans baccata* (Syst. ed. 10, 1272 & Sp. Pl. ed. 2, 1416) which was based on references to Browne (Hist. Jam. 346) and Sloane (Hist. II. i. t. 157. f. 1). The original of Sloane's figure is in Herb. Sloane (vol. v. f. 49) and is a specimen bearing immature male inflorescences. Grisebach (Flor. Brit. W. Ind. 177) includes the species under *Juglandeæ* as *Picrodendron Juglans*, Griseb. A second species, based on fruiting material only, has more recently been discriminated by Dr. Britton (Bull. New York Bot. Gard. iv. 139, 1906) to include plants from Cuba and the Bahamas.

A specimen bearing male flowers was collected in San Domingo by Fuertes, and an examination of this and of some excellent material of both male and female specimens sent from Jamaica by Mr. W. Harris has enabled us to supply the characters necessary to complete the diagnosis of the genus as follows :—

Diœcious. *Male inflorescence* of stalked axillary spikes crowded at the ends of dwarf branches and appearing with the leaves; flowers solitary or clustered, sessile, consisting of 16–32 stamens surrounded by an involucre of 4–6 imbricate bracts; perianth wanting; filaments very short, anthers 2-celled, basifixed, dehiscing longitudinally; pollen minutely muriculate; rudiment of ovary wanting. *Female flowers* stalked, solitary, axillary; calyx of 4 unequal valvate free sepals bearing minute glands at the base; petals absent; staminodes absent; ovary inferior, 2-celled, outer wall containing numerous vesicles; style terminal, slender, bearing 2 large spreading stigmas, ovules 2 in each cell, pendulous from apex of central axis, anatropous, raphe ventral, integuments two; a reddish-brown cushion-like outgrowth (obturator) springing from the placenta just above the insertion of the pair of ovules and closely roofing over the two micropyles. The obturator does not develop with the growth of the seed but becomes withered.

The fruit, which is well known, is a drupe, the thin fleshy exocarp full of vesicles contains a very bitter juice: the woody brittle endocarp marked with 4 equidistant longitudinal lines, contains generally one, occasionally 2 seeds, one in each cell. The seed is pendulous from the top of the cell, and without endosperm; testa membranous infolded between the folds of the cotyledons; radicle superior. The plant is a deciduous tree from 20 to 40 ft. high, with alternate long-stalked digitately trifoliolate leaves; leaflets elliptical to lanceolate.

The presence and form of the obturator at once suggested the family *Euphorbiaceæ* and this affinity is borne out by other floral characters.

BYRSONIMA.

In elaborating the Jamaican species of *Brysonima* we have been unable to follow the arrangement adopted by Niedenzu (in Arb. Bot. Inst. Braunsb. 20 June, 1901), who in our opinion relies too much on the characters of the bracts. The following three species are allied to *B. coriacea* DC. The Jamaican species of the genus may be arranged as follows :—

Inflorescence tomentose.	
Bracts not more than 4 mm. l.	
Pedicels over 8 mm. l.	*B. coriacea* DC.
Pedicels not over 8 mm. l.	
Leaves leathery, glabrous ...	*B. Craigiana*, sp. nov.
Leaves papery, puberulous ...	*B. Smallii*, sp. nov.
Bracts foliaceous, to 1 cm. l............	*B. bracteata*, sp. nov.
Inflorescence glabrous or with a few silky hairs...	*B. glaberrima* Nied.

Byrsonima bracteata, sp. nov. *Frutex* circa 3 m. alt. *Folia* elliptica, apice obtusa vel subrotundata, basi obtusa vel cuneata

chartacea, glabra, 7–9·5 cm. l., 3·5–4·5 cm. lat., nervis venisque supra subobsoletis, infra eximie reticulatis, vix prominulis; petioli 6–8 mm. l., glabri; stipulæ ovatæ, facie externa præsertim margine pilis ferrugineis obtectæ, 3·5 mm. l. *Racemi* 4–6 cm. l.; pedunculus ca. 2·5 cm. l.; pedicelli brevissimi; rhachis, pedunculus, atque pedicelli ferrugineo-tomentosi; bracteæ foliaceæ, anguste elliptico-oblongæ, basi attenuatæ, sessiles vel subsessiles, in facie interna glabræ, externa puberulæ vel glabrescentes, usque ad 1 cm. l. *Antheræ* glabræ. *Ovarium* glabrum. Type in Herb. Jam.

Hab. Flowers in bud in Sept.; Peckham, Clarendon, 2500 ft., *Harris* 11,202!

Byrsonima Craigiana, sp. nov. *Arbor* 4·5–12 m. alt.; ramuli novelli ferrugineo-tomentosi. *Folia* late elliptica, rotundata, vel obovato-elliptica, apice rotundata vel obtusissima, basi rotundata vel obtusa, coriacea, glabra, 4–7 cm. l., 2–5·5 cm. br., costa prominente, nervis planis subobsoletis; petioli 3–5 mm. lat., supra canaliculati atque glabrescentes; stipulæ lanceolatæ, 5 mm. l. *Racemi* 3–7 (–11) cm. l.; pedunculus ca. 3 cm. l.; pedicelli 3–8 mm. l.; rhachis, pedunculus atque pedicelli ferrugineo tomento obtecti; bracteæ e basi ovata lineares, ferrugineo-tomentosi vel glabrescentes, ca. 3 mm. l. *Sepala* 4·5–5 mm. l., glandulis 2·5 mm. l., ovato-oblonga, puberula. *Petala* rosea, sicca purpurea; lamina usque ad 4 mm. l., 6 mm. lat., unguicula 4 mm. l. *Filamenta* 3 mm. l., pilis paucis; antheræ oblongæ, glabræ, 1·5 mm. l. *Ovarium* glabrum. *Drupa* (? matura) globosa, 6–7 mm. in diam. *B. glaberrima* Small in N. Amer. Fl. xxv. 167 (1910) (non Niedenzu). Type in Herb. Jam.

Hab. In flower May–July, in fruit Sept.; near Troy, 2000 ft.; Peckham, Clarendon, 2500 ft. *Harris* 9411! 10,976! 11,026! 11,042!

This species is named after Mr. Robert Craig of Savoy, Clarendon, who has helped by sending specimens and in other ways in connection with the Flora of Jamaica.

Byrsonima Smallii, sp. nov. *Arbor* 5 m. alt. *Folia* late elliptica, subobovata, apice rotundata, basi obtusa vel rotundata, chartacea, supra plus minus puberula, costa utrinque puberula, infra cetera glabra, 3–6 cm. l., 2·2–3·5 cm. lat., nervis venisque supra subobsoletis, infra eximie reticulatis, vix prominulis; petioli 8–11 mm. l., ferrugineo-tomentosi; stipulæ ovatæ, obtusæ, ferrugineo-tomentosæ, 1·5–2 mm. l. *Racemi* 4 cm. l.; pedunculus 3–4 cm. l.; pedicelli ca. 6 mm. l.; rhachis, pedunculus atque pedicelli ferrugineo-tomentosi; bracteæ ovato-oblongæ in facie interna glabræ, externa ferrugineo-tomentosæ, 4 mm. l. *Sepala* 4 mm. l., glandulis 2 mm. l., triangulari-ovata obtusa, ferrugineo-tomentosa. *Petala* sicca atrato-rosea; lamina usque 4 mm. l., 7 mm. lat., unguicula 3–4 mm. l. *Antheræ* glabræ, ca. 1·3 mm. l. *Ovarium* glabrum. *Drupa* incognita. *B. Berteroana* Small in N. Amer. Fl. xxv. 167 (1910) (non A. Juss.).

"Wild Cashew." Types in Herb. Mus. Brit. & Herb. Jam.

Hab. In flower Aug.; near Troy, 2000 ft., *Harris* 8763!

This species is named in honour of John Kunkel Small, of the New York Botanical Garden, who has monographed the *Malpighiaceæ* of the North American Flora.

Zanthoxylum negrilense, sp. nov.

Arbuscula 5 m. alta, inermis. *Folia* paripinnata, 1·5–3 dm. l.; foliola 4–8, opposita, elliptica vel oblonga, apice obtusa subemarginata, interdum brevissime et abrupte acuminata, basi inæquilatera plus minus rotundata, margine integra, 7–13 cm. l., supra nitida, nervis prominulis et reticulato-anastomosantibus, eglandulosa; petiolo sicut rhachi supra anguste canaliculato. *Inflorescentiæ* terminales, paniculato-corymbosæ, 8 cm. l. *Carpidia* 3. *Cocci* plerumque 1, rarius 2, ellipsoidea, ad ventrem carinati, plus minus manifeste glanduloso-punctati et irregulariter rugoso-plicati, 5 mm. l.; endocarpio soluto, persistente; cocci abortivi 1 mm. l.

Hab. In rocky woodland, near lighthouse, Negril, 300 ft. alt. *Harris*, 10,242! In Herb. Jam.

This species is near the unarmed forms of *Z. spinosum* Sw., but differs in the much larger leaves. The specimen is in fruit and bears no flowers.

VERONICA BUXBAUMII.

By C. C. Lacaita, F.L.S.

Synonymy. *Veronica Tournefortii* C. C. Gmel. Fl. Bad. i. p. 39 (1805).
Veronica agrestis L. var. *byzantina* Fl. Gr. i. p. 6, t. 8 (1806).
Veronica persica Poir. Dict. viii. p. 542 (1808).
Veronica Buxbaumii Ten. Fl. Nap. i. p. 7, t. 1 (1811).
Veronica hospita M. & K. Deutschl. Fl. i. p. 332 (1823).
Veronica byzantina Britton Stern. & Pogg. Prelim. Cat. N.Y. p. 40 (1888).
Veronica areolata Colenso in Trans. N.Z. Inst. xxiv. p. 392 (1892).

The competing names for this well-known naturalised British plant have often been discussed, but there still remains something to be said. *Veronica Buxbaumii* Ten. is the only one of these names the meaning of which is absolutely indisputable. In vol. xlii. of this Journal (1894) p. 253 its claims were defended by F. N. Williams against those of *V. Tournefortii* Gmel. and *V. persica* Poir. Unfortunately his argument is based on the untenable premiss that both the latter names refer to *V. filiformis* Sm., a totally different species from Asia Minor which is never found naturalised in western Europe. In what follows I shall attempt to prove that *V. Tournefortii* Gmel. is a hopeless muddle of contradictory characters drawn partly from earlier descriptions of *V. filiformis* and partly from *V. Buxbaumii.* The name is therefore inadmissible for either species and must be rejected altogether in conformity with Art. 51 clause 4 of the international rules: "Everyone should refuse to admit a name when the group which it designates embraces elements altogether incoherent, or when it becomes a permanent source of confusion or error." This rule is just as cogent as that enjoining the use of the earliest published name, and it is fatal to E. Lehmann's defence of *V. Tournefortii* in his otherwise admirable paper on the *agrestis* group in Bull. Herb. Boiss. 2nd ser. viii. (1908).

V. persica Poir., which comes next in order of date, is not *V. filiformis*, nor *V. polita* Fries as suggested by Lehmann, but can hardly be anything else than *V. Buxbaumii*. Nevertheless its identity cannot be determined with absolute certainty until Poiret's original type can be found and examined: so far this has not been done and possibly the type no longer exists. *V. persica* therefore remains open to the accusation of being *nomen dubium*, and the employment of Tenore's name, although the latest in date, is probably the safest course to follow.

Buxbaum in plate xl. of his *Plantae minus cognitae*, Cent. i. (1727), shows two Veronicas of which he gives the old-style phrases on pp. 25, 26. Figure 1 represents *V. filiformis* Sm. in Trans. Linn. Soc. i. p. 195 (1791), under the title of *Veronica Orientalis, Hederae terrestris folio, flore albo* Tourn. Cor., collected in Bithynia near the Bosphorus and near Amasia. His quotation from Tournefort is not exact: the precise phrase in Tourn. Cor. p. 7 (1719) is *Veronica Orientalis, foliis Hederae terrestris, flore magno*. It is uncertain whether the substitution of "*albo*" for "*magno*" was intentional or a slip of the pen. Smith calls the flower blue and Boissier (Fl. Or. iv. 466) says "corolla caerulea."

Figure 2 is that on which Tenore based his name of *Buxbaumii*. It is called by Buxbaum himself *Veronica flosculis oblongis pediculis insidentibus, Chamaedryos folio, major*, and was collected in cornfields near Pera (Constantinople). The addition of the word *major* shows an intention to distinguish the plant from *V. flosculis oblongis pediculis insidentibus, Chamaedryos folio* of Morison (Hist. pt. 2, p. 322, tab. xxiv. no. 22 (1672)), quoted by Tournefort (Inst. p. 145). Morison's plant has small corollas and is said to be found everywhere in fields and at the foot of walls; it is commonly referred to *V. agrestis* L. The ubiquity assigned to it at that date excludes the possibility of Morison having had *V. Buxbaumii* in view.

This plant has also been wrongly referred to *V. filiformis* Sm. by Savi (Bot. Etr. i. p. 15: 1808), DC. (Fl. Fr. Suppl. p. 388: 1815) and others. It is confusion between Buxbaum's two plants that makes Gmelin's name as well as that of Mertens and Koch unusable. The difference between them was well known to Tenore who says, "The figure (2) of Buxbaum represents exactly this new species of *Veronica*, but it has not been recognised or described by any botanist *. *Veronica filiformis*, quite different from this, is placed by its side in the plate of the aforesaid author, and is quoted by Smith and by the Encyclopædia." The distinction is clearly pointed out in M.B. Fl. Taur. Cauc. iii. pp. 16, 17 (1819) and can be studied in Boiss. Fl. Or. iv. p. 466.

Gmelin's account of *V. Tournefortii* is too ambiguous and contradictory for it to be possible for anyone who has not preconceived ideas to say what he really intended to describe. The very name

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* This is not quite correct, for Smith in Fl. Gr. had described the plant as a variety of *V. agrestis*, but without referring to Buxbaum's figure.

V. Tournefortii is in reality only suitable for *V. filiformis* based on *V. orientalis* etc. of Tourn. Cor. p. 7, and not for *V. Buxbaumii*, the phrase for which is not to be found in Tournefort. The only synonyms quoted are *V. filiformis* Sm. and *V. orientalis* etc. Tourn. and Buxb. t. xl. f. 1 : (N.B. fig. 1, not fig. 2 to which there is no allusion). Then we are told that the root is perennial, which is obviously impossible for *V. Buxbaumii* though less unintelligible for *V. filiformis*, of which Boissier says "annua vel perennans." The capsules are called "semiorbiculata obcordata," which is precisely applicable to those of *filiformis* but not to those of *Buxbaumii*. On the other hand the leaves are said to be "cordato-ovata grosse dentato-serrata" which agrees with *Buxbaumii* but not with *filiformis*. In short, there is such a muddle in Gmelin's account that his name must be unhesitatingly rejected for either species. The habitat he quotes is "Carlsruhe in the fields at the Holzhof, emigrated a few years ago from the botanical garden and now almost spontaneous." An escape from a botanical garden may be any species, but it is in favour of *Buxbaumii* that that form has established itself in later years over great part of Europe, whereas *filiformis* has not done so.

To come to the claims of *V. persica* Poir. Williams's identification of this with *V. filiformis* Sm. is certainly wrong, as Lehmann has pointed out. Poiret cannot have intended *V. filiformis* because at p. 538 he had already given a good account of that species, which he had seen in Lamarck's herbarium. Did he then mean *V. Buxbaumii*? I think so, in spite of the doubts expressed by Syme (Engl. Bot. vi. p. 153 ; 1866), by Grenier (Fl. Jur. p. 586 ; 1865), and by Lehmann *. The last named author goes into the question most minutely (pp. 343–346) but comes to no definite conclusion. He was not really concerned to settle the identity of Poiret's plant, because from his point of view the name *persica* would at most amount to a synonym of Gmelin's *Tournefortii*. It is therefore all the more odd that he should have been so microscopically observant of the mote in Poiret's eye, whilst closing his own to the beam in Gmelin's : but then Poiret was a Frenchman and Gmelin a German. We must admit that Poiret's work in Dict. Encycl. is notoriously full of inaccuracies ; nevertheless there is every probability that his *V. persica* is precisely *V. Buxbaumii*. He states that it grows in Persia, but describes it from specimens cultivated in the Jardin des Plantes at Paris ; he refers to no synonym or figure. Objection has been taken to this identification on account of three characters which are said not to suit *V. Buxbaumii*. These are : (1) "Pédoncules . . . . ordinairement un peu plus conrts que les feuilles. (2) La corolle . . . . un peu plus court que le calice. (3) Capsule . . . . à peine de la longueur du calice, à deux lobes ventrus divergents."

To take these in order. (1) As Lehmann has pointed out, the remark about the flower-stalks is not fatal. Brand in the last edition of Koch's *Synopsis*, p. 205, says that these do not always show their characteristic length, but in winter-flowering specimens are often found hardly exceeding the leaf. Boissier describes them "folio plerumque longioribus" as against those of *filiformis*, "folio multoties longioribus." Now it is precisely this contrast that Poiret was concerned to point out, for he had described those of *filiformis* as "au moins quatre fois plus longs que les feuilles." *

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* Syme nevertheless says "it is probable that the name *V. persica* ought to be adopted," and Grenier's objections were an afterthought, for in G. & G. Fl. Fr. ii. p. 598 (1850) the name *persica* is used without comment. Rouy (Fl. Fr. xi. p. 53 : 1909) uses *V. Buxbaumii* with *V. persica* "diagn. valde ambigua, charact. infaust." as synonymous.

(2) This statement, if Poiret really meant it, is by far the gravest objection. Grenier says "du moment que Poiret déclare avoir vu la plante vivante, et affirme que la corolle est plus petite que le calice il ne me parait plus possible d'appliquer à notre plante le nom proposé par lui." Lehmann, however (p. 345), recalls the observation of Bateson & Pertz (in Proc. Cambr. Phil. Soc. x. 2, p. 78; 1899), that small corollas occur in *V. Buxbaumii* as an anomaly, and states that in the botanical garden at Leipzig in the summer of 1907 he found plants in which all the corollas were smaller than the calyx, whether indicating a hereditary race or due to some special local condition. My own explanation of Poiret's statement is simpler, though I admit that it is a mere guess. I fancy that "corolle un peu plus courte" was a mere slip of the pen for "corolle un peu plus longue."

(3) It is to this that another of Grenier's criticisms is directed. "Les caractères de la capsule donnés par Poiret ne peuvent qu'augmenter les doutes déjà si légitimes, car il dit; capsule à peine de la longueur du calice, à deux lobes ventrus. Or voilà encore des traits qui ne conviennent point à notre plante, dont la capsule comprimée est toujours plus courte que le calice." Observe that two separate objections are raised (*a*) to the comparative length of capsule and calyx, and (*b*) to the form of the capsule. As to (*a*); where is the contradiction? Poiret says "hardly so long as the calyx"; Grenier says that is wrong because it is always "shorter than the calyx." Surely it is ridiculous hairsplitting to reject Poiret's name on the difference between "shorter than" and "hardly so long as." Lehmann judiciously ignores this objection and only takes notice of (*b*), the form of the capsule. But on this point both he and Grenier are grossly unfair, quoting "lobes ventrus" but omitting the word "divergents"! It is quite true that "ventrus" is objectionable, for the ripe capsule is compressed, as described by Tenore. But whoever will take the trouble to look at the capsules while still green on the live plant, will see that they have not yet developed the character "compressed and carinate" which they acquire later.

If Poiret was describing the plant in an early stage it would account for the "lobes ventrus"; for the short flower-stalks; and possibly even for the small corollas. But what about the "lobes divergents"? This phrase, so carelessly—or carefully—omitted by Grenier and by Lehmann, is absolutely conclusive for *Buxbaumii*. It will not fit any other European species of the section, and is fatal to Lehmann's unfortunate suggestion that Poiret's plant may be *V. polita* Fries. He hints, as an alternative, that it may be an intermediate between *V. polita* and *V. Tournefortii* (sc. *V. Buxbaumii*). This is too speculative. If he had seen and examined a type of Poiret's before making the suggestion, it might be taken into consideration, but as a hypothetical explanation of Poiret's loose language it is somewhat too *à priori* even for the German school.

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* This contrast is alone sufficient to condemn Williams's identification.

In favour of the position *V. persica* = *V. Buxbaumii* are Poiret's words "cette plante offre tous les caractères du *V. agrestis*, mais elle est bien plus grande." The association with *agrestis* might seem to admit of *V. polita*, but the words "bien plus grande" would exclude Fries's species, even apart from the divergent lobes of the capsule.

Lastly come Gaudin's observations in Fl. Helv. i. p. 36 (1828), of which Lehmann, p. 344, intentionally or unintentionally, suppresses the part that is favourable to the identification of *persica* with *Buxbaumii*. Here is the whole: "*V. Buxbaumii* Ten.; *V. persica* H. P. certo; Poir. Encycl. (ob pedunculos folio paulo breviores et corollas calyce minores syn. dub.) . . . . *V. persica* H. P. quam in eo horto legit amiciss. J. Gay ac mecum communicavit, a nostra neutiquam differre videtur, etsi pedunculos paulo breviores habet." Things which are equal to the same thing are equal to each other. Poiret described the H. P. plant. The H. P. plant in 1828 was *V. Buxbaumii*. Until it is possible to examine the specimen which, as M. Lecompte informs me, still exists in Poiret's Herbarium in Mus. Par., this is surely as near as possible to proof that the plant described by him was *V. Buxbaumii*.

It has sometimes been objected to Gmelin's name that in 1805 there was already an earlier *V. Tournefortii* in existence. The reasons given above for its rejection are quite sufficient without relying on this technicality, to which I only allude because it has become a focus of misstatements. The earlier *Veronica Tournefortii* is not due to Villars, as commonly supposed. Lehmann exercises a vivid imagination when he says at p. 341, "Villars in Prosp. Dauph. 1779, p. 30 eine *V. Allionii* var. *Tournefortii* beschreibt, die er schon am Ende dieser Arbeit und weiterhin in Histoire des Pl. Dauph. 1787 zur Art erhebt." It is not true that Villars describes a *V. Allionii* var. *Tournefortii* in the Prosp. Dauph. It is not true that he raises it to a species at the end of that work. It is not true that it is to be found as a species in Hist. Pl. Dauph. What are the facts? In the Prospectus at p. 20 he describes *V. Allionii* and assigns as a synonym, not as a variety, *V. mas repens pyrenaica folio rotundo hirsuta* Tourn. The name var. *Tournefortii* does not occur. There is no further allusion to this or to any other *Veronica* in the Prospectus. Nor is the name mentioned, either as species or as variety, in the Fl. Delph. of 1785. But in Hist. Pl. Dauph. ii. (1787) *V. Allionii* appears at p. 8 without Tournefort's synonym, and at p. 9 we find "B. *V. Tournefortii* Prosp. 20" with the synonym in question, and further on "la variété B. ne diffère de la précédente" (sc. *V. Allionii*) "que par etc." This passage creates *V. Allionii* var. *Tournefortii*, if you will, but not a species *Veronica Tournefortii*. No doubt it is Villars's own erroneous citation of his Prospectus that has led to the careless attribution to him of a specific name which is really due to Schmidt, Fl. Boem. p. 7 (1793). But Schmidt's *V. Tournefortii*, although he quotes *V. caule repente etc.* Vill. and *V. mas repens pyrenaica etc.* Tourn., is a plant of the Bohemian ranges, probably different from *V. Allionii* var. *Tournefortii* Vill., though identical with *V. officinalis* as suspected by Schmidt himself and determined by Celakovsky in Fl. Böhm. p. 326.

There also exists an earlier *V. Buxbaumii*, of F. W. Schmidt in Mayer's Samml. Phys. Aufs. i. p. 187 (1791), wrongly referred by Ind. Kew. to *V. pectinata.* As Lehmann has shown, p. 478, this is really *V. hederifolia* L. Thus if Gmelin's name had to be rejected only on account of a prior *V. Tournefortii*, Tenore's should be set aside with equal justice by reason of the *V. Buxbaumii* F. W. Schmidt, unless it can be proved that between 1791 and 1811 some author had deliberately and finally reduced Schmidt's name to a synonym or variety of some still earlier species. It is for this reason that the American botanists have set up the name of *V. byzantina.*

One word about *V. hospita* M. & K. These authors set up that name to include as one species with two varieties both *V. Buxbaumii* and *V. filiformis.* Of course the German form which they took for *filiformis* is not that species, but a variation of *Buxbaumii.* Koch in the first edition of the *Synopsis*, p. 530 (1838), admits the mistake and adopts Tenore's name.

It is a pity that Smith did not assign specific rank to his *V. agrestis* var. *byzantina*, which is indisputably *V. Buxbaumii*, for then we should have had an earlier name than Poiret's free from any obscurity. Of course the rules of priority make it impossible, except for American botanists, to accept *V. byzantina* Britton Stern. & Pogg. The identity of *V. areolata* Colenso with *V. Buxbaumii* has been recognised by Cheeseman, Man. N. Z. Fl. p. 1082 (1896), and confirmed by Lehmann.

THE BOTANY OF BURNHAM BEECHES.

By J. G. Baker, F.R.S., F.L.S.

Burnham Beeches is the name given to 374 acres of wild forest land in the south of Buckinghamshire. It formerly belonged to the Grenville family, whose seat was at Dropmore two miles distant, but it has been bought by the Corporation of London for the benefit of the public. About half the area is woodland and the other half common, but they pass into one another gradually. The soil is sandy and gravelly. There are three pools much overgrown by vegetation and a small amount of bog. The flora is not a large one, and there is not much range in situation and it is probable that nine plants—Beech, Birch, Oak, Holly, Bracken, Ling, Bell Heather and two grasses *Deschampsia flexuosa* and *Molinia cærulea*—occupy quite three quarters of the whole area. I have marked with a star the dominant species, and with a dagger those that only grow in the bordering hedges, hedgebanks and roadsides, and not in the depths of the forest. The list was made late in July and early in August and no doubt many early-flowering species have been overlooked. None of the area exceeds 100 yds. above sea-level, so that Burnham Beeches all falls in Watson's Inferagrarian zone.

†Clematis Vitalba, Ranunculus heterophyllus, R. acris, R. repens, R. Flammula. Nymphæa alba, Nuphar luteum. Nasturtium officinale, †Sinapis arvensis, †Capsella Bursa-pastoris, †Raphanus Raphanistrum. Viola palustris, V. odorata, V. sylvatica. Lychnis dioica, Stellaria graminea, S. uliginosa, Spergularia rubra. Hypericum perforatum. †Malva rotundifolia. Geranium Robertianum, Oxalis Acetosella.

†Acer Pseudoplatanus. *Ilex Aquifolium. Euonymus europæus. Rhamnus Frangula. Genista anglica, Ulex europæus, U. Gallii, Cytisus scoparius, *Trifolium repens, T. pratense, T. minus, Lotus corniculatus, L. major, Vicia sepium. Prunus spinosa, Potentilla Anserina, *P. Tormentilla, Rubus idæus, R. rhamnifolius, †R. corylifolius, †R. rusticanus, R. pulcherrimus, R. Sprengelii, R. dasyphyllus, Agrimonia Eupatoria, *Cratægus monogyna, Pyrus Malus, P. Aria, Rosa canina, †arvensis. Drosera rotundifolia. Epilobium angustifolium, E. obscurum, E. palustre. †Bryonia dioica. Hydrocotyle vulgaris, Helosciadium nodiflorum, Heracleum Sphondylium, *Anthriscus sylvestris, Torilis Anthriscus. Hedera Helix.

Galium †Mollugo, palustre, G. saxatile, G. verum, †G. Aparine. Sambucus nigra, Lonicera Periclymenum. Scabiosa Succisa, *Knautia arvensis. †Bellis perennis, Solidago Virgaurea, Achillea Millefolium, †Matricaria Chamomilla, †Chrysanthemum Leucanthemum, Senecio Jacobæa, †Arctium Lappa, Centaurea nigra, Cnicus palustris, C. arvensis, †Lapsana communis, †Crepis virens, Hieracium boreale, *Leontodon autumnalis, †Taraxacum officinale. *Campanula rotundifolia. *Erica Tetralix, E. cinerea, *Calluna vulgaris. Menyanthes trifoliata. Myosotis palustris. †Convolvulus arvensis, †C. sepium, Cuscuta Epithymum. †Solanum Dulcamara. Plantago major, P. lanceolata. Veronica Beccabunga, Melampyrum pratense, Pedicularis sylvatica. Mentha sativa, Lycopus europæus, Thymus Serpyllum, *Calamintha Clinopodium, †Glechoma hederacea, Stachys sylvatica, *Galeopsis Tetrahit, †Lamium album, †L. purpureum, Teucrium Scorodonia, †Ballota nigra.

Polygonum amphibium, P. Persicaria, P. Hydropiper, Rumex sanguineus var. viridis, R. conglomeratus, R. obtusifolius, R. Acetosella. Mercurialis perennis, Euphorbia amygdaloides. †Ulmus campestris, †Humulus Lupulus,†Urtica dioica. *Betula alba, Alnus glutinosa, *Quercus pedunculata, Corylus Avellana, *Fagus sylvatica. Populus tremula, Salix fragilis, S. cinerea, S. caprea, S. repens.

Pinus sylvestris (planted), Juniperus communis.

Iris Pseudacorus. Narthecium Ossifragum. Juncus effusus, J. conglomeratus, J. glaucus, J. squarrosus. Sparganium ramosum. *Arum maculatum. Alisma Plantago. Potamogeton natans. Rhynchospora alba, Scirpus fluitans, Carex stellulata, C. ovalis, C. binervis. Anthoxanthum odoratum, Phleum pratense, Agrostis vulgaris, *Deschampsia flexuosa, D. cæspitosa, Holcus lanatus, H. mollis, Trisetum flavescens, Arrhenatherum avenaceum, Triodia decumbens, Cynosurus cristatus,, *Molinia cærulea, Melica uniflora, Dactylis glomerata,

Poa pratensis. Festuca pratensis, *F. ovina, Bromus mollis, Brachypodium sylvaticum, Lolium perenne, Nardus stricta.
*Pteris Aquilina. Equisetum limosum.

NOTE ON RITCHIEA.

By James Britten, F.L.S.

This genus is always cited as of Robert Brown, with a reference to his "Observations on . . . the more remarkable plants" published in the Appendix to the *Narrative of Travels* by Denham and Clapperton (1826), pp. 208–248. A consultation of this work however (p. 225) shows that not only that there is no diagnosis of the genus, but that its mention is merely incidental: the passage runs: "All the species referred to *Cratæva* by M. De Candolle really belong to it, except *C. fragrans*, which, with some other plants from the same continent, forms a very distinct genus, which I shall name *Ritchiea*, in memory of the African traveller whose botanical merits have already been noticed." This relates to p. 209, where Brown refers to a herbarium formed by [Joseph] Ritchie near Tripoli and on the Gharian hills, consisting of 59 species carefully preserved, "the particular places of growth" being indicated "and observations added on the structure of a few." In addition to the genus, Brown also commemorated him in *Colchicum Ritchii* (*sic*: op. cit. 241). Some account of Ritchie will be found in Dict. Nat. Biogr. xlviii. 323, and the *Narrative of Travels in Northern Africa* (1821) by Captain G. F. Lyon, who accompanied him, gives details of the journey (which, however, contains no reference to plants) and of Ritchie's illness and death. That Brown was thoroughly acquainted with the species which he made the type of his genus is shown by the very full description of it in his numerous MSS. on the *Capparideæ* *: it may however be doubted whether he intended to limit *Ritchiea* as it has been subsequently understood, as it will be observed that he associated with *C. fragrans* "some other plants" as forming the new genus, none of which were indicated by himself or contemporary writers. The earliest description of the genus that I have found is that of George Don (Gen. Syst. i. 276: 1831), where the name is spelt *Richiea*.

It will be seen that the combination *Ritchiea fragrans* was not actually made by Brown, although, as in the case of the genus, it has become customary to attach his name to it. Nor does it seem that it can stand, in view of the earlier description of *C. fragrans* by Andrews as *C. capparoides*. Sims, who gave it the former name, says (Bot. Mag. 6. 596): "It is at the desire of Dr. Afzelius [who discovered the plant] that we have given it the specific name of *fragrans*, that of *capparoides*, equally applicable to other species of *Cratæva*, though hastily given by him to Mr. Evans, as something to remember it by, being never intended for publication." Be this as it may, published it was, and the plant must be known as *R. capparoides*. The following may stand as a statement of the position of genus and species:

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* It may be desirable again to call attention to the extensive collection of Brown's MSS. in the National Herbarium which, though seldom if ever consulted, contain a vast amount of unpublished information.

Ritchiea R. Br. in *Narrative of Travels* by Denham and Clapperton, 225: 1826, (*nomen*); G. Don, Gen. Syst. i. 276: 1831 (*Richiea*).

R. capparoides comb. nov.
Cratæva capparoides Andr. Bot. Rep. t. clxxvi. (1801).
C. fragrans Sims, Bot. Mag. t. 596 (Oct. 1, 1802).
C. moschata Herb. Banks ex Sims l. c.
Ritchiea fragrans R. Br. ex G. Don, l. c., et auct.: Gilg in Engl. Bot. Jahrb. xxxiii. 208 (1902), liii. 176 (1915).

Gilg (l. c.) queries the locality Sierra Leone, but our specimen from Afzelius is so endorsed. There was no specimen from Ritchie in Brown's herbarium.

TROPICAL AMERICAN RUBIACEÆ.—IX.

By H. F. Wernham, D.Sc., F.L.S.

(Continued from p. 254.)

Palicourea acanthaceoides, sp. nov. Frutex ramulis rectis graciliusculis, minutiuscule in novitate pubescentibus demum glabrescentibus lævibus, superioribus saltem sub nodos valde modo *Acanthacearum* constrictis, in inflorescentiis angustissime necnon longissime cylindrico-pyramidalibus terminantibus laxiusculis cymularum racemosis. *Folia* angusta lanceolata utrinque longe leniterque acuminata, supra glabra subtus in venis patente-pubescentia, crassiuscula coriacea, venis subtus præsertim principali prominentibus, secundariis utrinque ca. 15; *stipulæ* persistentes basi subvaginantes late necnon breviter oblongæ pubescentes aristis 3 distantibus lanceolatis instructæ rigidiusculis acutis. *Inflorescentiæ* rachis elongata validiuscula striata ferrugineo-pubescentis, *bracteis* parvis setaceis necnon conspicuis, cymulæ laterales pedunculatæ paucifloræ laxiusculæ. *Calyx* minimus late rotunde lobatus; *corollæ* tubus latiusculus cylindricus extus sparse rufo-pilosus glabrescens, lobis brevibus anguste oblongis obtusis erectis.

Peru: *Mathews* 1946!

Allied to *P. angustifolia* H. B. K., from which it differs in the much more ample and longer inflorescence, and in the shorter, relatively stouter and more tubular flowers. *Leaves* 11–16 cm. × 3–3·7 cm., drying a very bright vivid green, with petiole 4–10 mm. long; *stipules*, sheathing basal part 2–3 mm., prongs about the same length. The branchlets run directly into the median rachis of the inflorescence, and the lowest branch of the latter may arise immediately above the last leaf-node. The rachis may grow to nearly 30 cm. in length; the width of the inflorescence at the base is about 8 or 9 cm. *Corolla* rarely much more than 1 cm. in length and ± 3 mm. wide.

Palicourea acetosoides, sp. nov. Frutex nisi sparsissime foliorum subtus in vena centrali minute pilosus glaber, ramulis læve striatis obtuse subangulatis. *Folia* firme papyracea elliptico-obovata apice vix acuminata basi leniter in petiolum pro rata brevem cuneatim angustata; *stipulæ* insuper bifurcatæ infra longiuscule caulem arcte vaginantes. *Flores* minimi in cymulis lateralibus nisi basin versus longiusculis pro rata brevissimis ramulis gracilibus, in rachide principali ramulum continuante elongatissimo dispositi validiusculo, *bracteis* exiguis. *Calyx* parvus subcoriaceus obscuriuscule lobatus, lobis oblongis obtusis. *Corolla* breviter oblonga tubularis, limbo suberecto breviter obtuse lobato, extus minutissime necnon sparsiuscule sulphureo-pulverulens.

Colombia: *Triana* 126!

Allied to the Brazilian *Psychotria* (§ Palicourea) *tabacifolia* Muell. Arg., from which it differs chiefly in the oblong shape and size of the corolla, with its very small lobes. *Leaves* ca. 16 cm. × 6·5 cm., with stalk barely 1·5 cm. at most; secondary veins, about 15 pairs; sheath of *stipules* 5 mm. long, with two lanceolate prongs, 1·5 mm. apart, over 2 mm. long, between the petiole bases on each side of the stem. Main rachis of *inflorescence* as much as 30 cm. or longer; at the base it bears one or two slender branches about 6 cm. long; for the rest of its length there are no branches exceeding 1 or 2 cm., and they are ascending; the whole inflorescence is thus spicate, and very slender. The tubular flowers are barely 4 mm. long.

Palicourea irrasiflora, sp. nov. Ramuli valde complanati læves nisi minute pulverulentes glaberrimi. *Folia* opposita magna papyracea glabra, elliptica apice acuminata obtusa basi breviter cuneata, breviuscule petiolata, petiolo compresso; *stipulæ* caducissimæ vestigium nec relinquentes. *Flores* pedicellati in paniculis subthyrsoideis ramulis complanatissimis subglabris v. minutissime puberulis laxiusculis ramula terminantibus dispositi, *bracteis* paucis subexiguis subsetaceis. *Calyx* brevissimus lobis latis ovato-orbicularibus margine ciliolatis; *discus* prominens hemisphærico-depressus glaberrimus. *Corolla* inter majores extus densiuscule lanato-pulverulens, basi ventricosa infra medium contracta insuper ampliata, lobis parvis oblongis, ore angustata.

Peru: *Ruiz & Pavon*!

Allied to the Brazilian *P. lanata* Müll. Arg., differing in the very flattened branchlets, the thin leaves with early caducous stipules, and the distinctly lobed calyx. *Leaves* (uppermost) 20 cm. × 7·5 cm., with stalk 2 cm. long. *Inflorescence* about 10 cm. long and 7–8 cm. in widest part, on peduncle (measured from nearest leaf-node) 8–9 cm. long. *Calyx* less than 1 mm. deep, 2·5 mm. wide, much shallower than the disc. *Pedicels* 3 to 6 mm. long. *Corolla* 1·8–2 cm. long, 4 mm. broad at the base, narrowed to a waist of 2·3 mm. at 4 mm. above the base, and over 5 mm. wide in upper part.

Palicourea lineariflora, sp. nov. Arbor omnino glaberrima, ramulis angulatis striato-lævibus. *Folia* subcoriacea elliptica utrinque breviter acuminata apice subacuta, petiolata venis subtus valde prominentibus secundariis utrinque ± 10; *stipulæ* breves latæ basi persistentes vaginantes, aliter in partes 2 superioribus rigidis lanceolatis brevibus acutis divisæ distantibus. *Inflorescentia* trichotoma subumbellata laxiuscula, *bracteis* paucis minutis. *Calyx* parvus, tubo supra ovarium constricto, lobis crassiusculis ovatis subacutis minimis persistentibus; *corolla* gracillima elongata, limbo subexiguo constricta. *Bacca* parva alte sulcata subglobosa calyce necnon disco conspicuo tamen parvo coronatus persistente.

Colombia: Llano de S. Martin, 1460 ft. *Triana* 1639! 77!

Allied probably to *P. crocea* R. & Sch., but at once distinguishable by the very slender, elongated corolla. *Leaves* 5–11 cm. × 2·5–5 cm., with petiole sometimes over 1·5 cm. in length. Sheath of *stipule* 3·5 mm. deep, the two prongs about 2 mm. Primary peduncles (3) about 3 cm. long, the umbel about 7–8 cm. in its widest part. *Corolla* 1·5–2 cm. long, narrowly linear. *Ovary* with calyx barely 2 mm. *Berry* scarcely 5 mm. in diameter.

Palicourea ochreata, sp. nov. Ramuli obtuse angulati complanati dense luteo-tomentosi tandem pubescentes verisimiliter glabrescentes. *Folia* firme pergamacea, anguste elliptico-lanceolata utrinque longe acuminata, basi in petiolum brevem luteo-tomentosum desinentia, utrinque asperula hispidulo-pubescentia, venis supra plus minus obscuris subtus prominulis secundariis utrinque ca. 18; *stipulæ* vaginam longe oblongo-cylindricam formantes, extus dense flavo-tomentosam intus glabram uno latere desuper a margine 3–4-apiculatam fissam. persistentem. *Flores* in thyrso minusculo foliis multo breviore hispidulo-pubescente dispositi laxiusculo, *bracteis* parvis paucis lanceolatis acutis inconspicuis. *Calyx* exiguus dentatus; *corolla* sparsiuscule pubescens tubo brevi necnon latiusculo insuper sub lobos ampliato ovatos subacutos tubo 3–4-plo breviores.

North East Ecuador: Prov. Carchi, Mt. Tulcan, 10,000 ft., 5 February, 1881, *Lehmann* 669!

A very distinct species, readily recognizable by the stipules and young branchlets clothed with mustard-yellow pubescence, the character of the former separating it readily from *Psychotria Aschersoniana* K. Sch. which it resembles, superficially, at least. *Leaves*, about 18 cm. × 4·5 cm., with stalks less than 2 cm. long; *stipular* sheath 1–1·5 cm. long, its edge with apiculæ 3–4 mm. long. *Corolla*-tube 6–7 mm. long, 3 mm. wide at mouth, lobes 2 mm. × 1 mm.

Palicourea vagans, sp. nov. Frutex subscandens, plantas inter alias verisimiliter vagans, ramulis ultimis elongatis, validiusculis parum ramosis, ramulis lateralibus longiusculis in novitate densiuscule minute ferrugineo-pubescentibus mox glabrescentibus; ramuli omnes irregulariter sulcatis v. angulatis, v. striatis, mox cortice cano-flavusculo crassiusculo indutis transverse subregulariter frangente; *folia* minuscula crassiuscule coriacea, elliptica utrinque leniter necnon breviter apice acuminata sæpius obtusa, basi sæpius cuneata, in maturitate glaberrima, supra subnitentia, juniora nonnunquam subtus in venis præsertim principali hic inde patente sparse pilosa; venis subtus prominentibus supra impressis, secundariis utrinque 10–12; petiolus brevissimus complanato-angulatus demum glaberrimus; *stipulæ* vaginam fuscam oblongam formantes coriaceam persistentem insuper irregulariter fisso-lobatam. *Flores* parvi in cymulis foliis sæpius brevioribus dispositi laxiusculis terminalibus necnon in axillis superioribus oriundis; pedunculi raro producti, sæpius occlusi, *bracteis* parvis lanceolato-setaceis v. linearibus. *Calyx* infundibularis breviter subacute deltoideo-dentatus; *corollæ* extus glabræ v. minutissime ferrugineo-furfuraceæ tubus gracilis insuper sensim ampliatus, lobi triangulares obtusi. *Bacca* parva pisiformis apice umbonata late sulcata.

Colombia: Mt. Quindio, 7800 ft., *Triana* 131 (1666)! Venezuela: *Funck & Schlim* 1296!

Apparently a straggling, much-branched bush, the branches early clothed in a coarse, furrowed, shining, silvery-yellow bark. The tough *leaves* are from 4 cm. to 7 cm. long and 2 to 3 cm. wide, with stalk up to 8 mm. long. Sheath of *stipules* 4–6 mm. long. *Calyx* very small. *Corolla*-tube to 14 mm. long, 5 mm. wide at the mouth; lobes 3 mm. long, 2·5 mm. broad at the base. *Berry* about 6 mm. in diameter.

Allied to *P. myrtifolia* K. Sch. & Kr., differing especially in the characters of the corolla.

Palicourea fragilior, sp. nov. Frutex tenuis dichotome ramosus octopedalis, nisi foliorum subtus in venis hic inde sparsissime pilosus glaberrimus, ramulis gracillimis lævibus creberrime striatis, sub nodos sæpius modo *Acanthacearum* multarum constrictis. *Folia* firme pergamacea latiuscule saliciformia, lanceolata basi acuta longe acuminata apice acuta, petiolata; *stipulæ* vaginam brevissimam 4-dentatam formantes inconspicuæ. *Flores* sulphurei plures conspicue pedicellati in panicula terminali laxa dispositi sessili, *bracteis* linearibus ad setaceis nonnullis longiusculis. *Calyx* cum ovario infundibularis glaberrimus, lobis breviter oblongis apice obtusissimis in siccitate viridiuscule discoloribus. *Corollam* extus glaberrimam inter minores apertam non vidi.

Ecuador: in woods, Talancay, along the river Chanchan, August, *Spruce* 6010!

A graceful plant, the lax panicles of cymes arising from the last node of the slender branchlets, and not much exceeding the *leaves*. The latter are 6–13 cm. × 1·5–4 cm., with petiole up to 1 cm. long, rarely much more; secondary veins about 12–14 pairs; *stipules* barely 2 mm. in length. *Inflorescence* about 7–8 cm. long, and 6–7 cm. wide at the base. The long *bracts* measure over 1 cm. *Calyx* (with ovary) 2–3 mm., lobes barely 1 mm. long.

The species is readily recognized by the glabrous, almost shining corollas, and the conspicuous calyx-lobes, together with its slender habit and narrow, lengthily-acuminate, leaves.

Palicourea quindiensis, sp. nov. Frutex ramosus, ramulis graciliusculis divaricatis cum ramis validioribus ferrugineo-tomentosis demum glabrescentibus. *Folia* breviter petiolata conferta, rigide coriacea, supra glabra subnitentia subtus præsertim in costa media venisque secundariis utrinque 10–12 prominentes puberula, elliptica v.

elliptico-oblonga, apicem subacutum versus acuminatissa subcaudata basi obtusa v. subrotundata; *stipulæ* in vaginam tubulosam extus puberulam nonnunquam glabrescentem connatæ, apice in aristas 4 acutissimas vaginam multo longiores desinentes. *Flores* pro genere inter minimos breviter pedicellati in paniculis terminalibus folia parum excedentibus dispositi floribundis; rachis qua ramuli tomentosa necnon complanata; *bracteæ* parvæ tamen manifestæ setaceæ. *Calyx* minimus glabrescens obtuse oblonge lobatus. *Corolla* brevis subinfundibularis brevissime lobata extus minute puberula. *Bacca* parva glabra alte sulcata calycis limbo persistente coronata.

Colombia: Mt. Quindio, 7800 feet; *Triana* 78 (1663)!

Allied to *P. querceticola* K. Sch. & Kr., from which it is readily distinguished by the smaller inflorescences largely overtopped by the leaves, and the short corolla, funnel-shaped rather than tubular. The *leaves* are tough and more or less rugose, with very prominent veins; they measure 5–9 cm. × 2–3 cm., with stalks not more than a few millimetres in length; the adult *stipules* form a sheath some 2–3 mm. deep, with "prongs" 6 or 7 mm. long. *Inflorescence* 6–10 cm. × 1·5–2·5 cm. *Flowers* not exceeding 8 or 9 mm. in length. *Berry* oblique, about 4 mm. in diameter.

Palicourea Moritzii, sp. nov. Frutex ramis glabris striatis teretibus, ramulis complanatis gracilibus minute sparsiuscule puberulis; *folia* firme chartacea anguste elliptica v. lanceolata utrinque acuminata apice subacuta, utrinque nisi in novitate subtus in venis obscure pilosa glaberrima, costis secundariis utrinque 10–12 subtus prominulis, petiolo tenuiusculo glabro complanato; *stipulæ* in vaginam brevissimam extus glabrescentem connatæ, insuper in aristis 4 vagina vix longioribus desinentes. *Flores* conspicue pedicellati nec pro genere inter majores in paniculis terminalibus longe pedunculatis dispositi folia excedentibus; rachis ut ramuli complanata obscure ferrugineo-tomentosa glabrescens; *bracteæ* cum bracteolis parvæ setaceæ. *Ovarium* cylindricum cum calyce obscure puberulum v. glabrum lobis obtusis. *Corollæ* tubus extus glabræ infra gracillimus insuper sub lobos breves reflexos ovatos obtusos leniter ampliatus.

Colombia: *Moritz* 844!

Also allied to *P. querceticola* K. Sch. & Kr., from which it differs in the narrow, very acuminate leaves, and short corolla widened above. The *leaves* are from 6 cm. to 13 cm. in length, narrowing into a stalk 1 cm. or longer, and are from 2 cm. to 3 cm. wide; they are of much thinner texture than that in *P. querceticola*. Sheath of *stipules*, about 2 mm. deep, with prongs 2–3 mm. long, sometimes more. *Peduncle* 4–5 cm., *inflorescence* 5–7 cm. × 2–3 cm. *Flowers* 1·5 cm. long, 4–5 mm. wide at the mouth, with lobes 1·5 mm. × 1·5 mm.

Palicourea pasti, sp. nov. Frutex glaberrimus, ramulis striato-sulcatis validiusculis, ramis irregulariter obtuse angulatis ad nodos nonnunquam tumidis. *Folia* coriacea, modesta nonnunquam parva, elliptica v. obovato-lanceolata, vix v. brevissime acuminata apice obtusa, basi acuta, utrinque glaberrima, costa media cum venis primariis utrinque 7–13 subtus prominens supra impressa; *stipulæ* in vaginam oblongam connatæ in lateribus plus minus fissam apice subtruncatam obscure lobulatam longe persistentem. *Flores* in cymis amplis corymbosis multifloris dispositi, omnino glabris nitentibus, *bracteis* cum bracteolis parvis plus minus concaveis ovatis v. lanceolatis acutis. *Calyx* cum ovario minimus obtuse lobulatus; *corollæ* tubus validiusculus basi inflatus insuper ampliatus, lobi 4 ovati cucullato-concavei intus piloso-pubescentes.

Colombia: Pasto, 8450 feet, *Triana* 1650! 1658!

A somewhat isolated species, apparently, distinguished especially by its complete glabrousness, ample inflorescences, and short stout 4-merous corolla. The *leaves* are variable, both in shape and size, measuring from 4 cm. to 12 cm. in length, and 2 cm. to 5 cm. in breadth; with rather stout stalk from 4 mm. to 12 mm. long; the *stipular* sheath is 4–8 mm. deep. The *inflorescence* branches from the very base, or arises upon a short peduncle, and is as much as 15 cm. across. *Calyx* less than a millimetre long; *corolla*-tube not exceeding 6 or 7 mm. in length, the lobes 2 mm.

Cephaëlis ostreophora, sp. nov. Frutex glaber ramulis novellis compresso-striatis tenuiusculis demum subteretibus. *Folia* firme membranacea, lanceolata longe acuminata acuta, basi rotundata, petiolo brevissimo; venæ secundariæ utrinque ca. 9; *stipulæ* parvæ basi brevissime triangulares insuper in aristis 2 subsetaceis persistentibus desinentes. *Flores* in capitulis cymosis minusculis 7–10-floris, pedunculo breviusculo gracili minute pubescente dispositi sessiles, bractearum involucro ad basin liberarum circumdatis; quæ *bracteæ* (exteriores saltem) late ovatæ cordatæ acuminatæ acutæ, palmatim e basi venatæ, in siccitate in centro brunneæ aliter subazureæ. *Calyx* minimus inconspicuus cupularis subinteger; *corolla* graciliter elongata extus glaberrima, limbo angusto patente, involucrum excedens.

Colombia: *Triana*!

Allied to *C. Evea* DC., but readily distinguished by the persistent setæ of the stipules, the smaller corolla with relatively much smaller limb, the more delicate and curiously tinted involucral leaves, etc. The *leaves* are 7–11 cm. long, by 2·3–3·5 cm. broad, the stalk not exceeding 3 mm.; *stipules* with setæ to 8 mm. or longer. *Peduncle* to 2 cm. long; *bracts* of involucre ± 1·7 cm. × 1·3 cm. *Corolla*-tube 1·6 cm. long, limb barely 5 mm. in diameter; *style* exserted about 5 mm.

Cephaëlis pseudaxillaris, sp. nov. Frutex glaber ramulis valde compresso-sulcatis gracilibus. *Folia* firme chartacea, elliptico-lanceolata utrinque acuta acuminata, supra in siccitate olivaceo-brunnea subfusca subtus pallidiora, basi in petiolum gracilem brevem leniter angustata; venæ secundariæ tenerrimæ subtus prominulæ utrinque ca. 9–12; *stipulæ* majusculæ ovato-oblongæ vaginantes. *Flores* in capitulis aliribus dense congesti parvi, inflorescentiæ ramulis in anthesi suppressis demum in fructu apparentibus nec tamen elongatis; capitulæ stipulis necnon *bracteis* paucis membranaceis latis majusculis involucri modo involucratæ subinclusæ. *Calyx* exiguus breviter dentatus: *corolla* brevis infundibularis, ore dense barbata, dentibus triangularibus brevibus demum reflexis acutiusculis onusta. *Bacca*

subpyriformis parva angulato-sulcata, pedicellum subæquans v. excedens.

Colombia: Choio, Barbacoas, 3200 ft. *Triana* 1689!

Allied to *C. axillaris*, from which it is easily distinguished by the corolla and fruit-characters. *Leaves* 8–16 cm. × 3·5–5·5 cm.; with petiole rarely over 1·5 cm. long; *stipules* to 1 cm. long. Heads, 1·5 cm. wide and rather more than 1 cm. long. *Corolla* 5–6 mm. long, limb about 4·5 mm. wide. *Berry* 5 mm. long and about 3 mm. wide in the upper part.

PLANTS OF SEYCHELLES AND ALDABRA.

By W. B. Hemsley, F.R.S., and W. B. Turrill, B.Sc.

Last year a beginning was made in this Journal (Supplement ii. pp. 24 and pp. 361 to 363) with the publication of the botanical results of the Percy Sladen Expedition to the Indian Ocean, together with a few additional new plants collected by the Hon. H. P. Thomasset and Mr. P. R. Dupont, Curator of the Botanic Station at Mahé. A combination of adverse circumstances prevented the continuation of the work, which will have to remain in abeyance at least until the war is over. It is hoped, however, that the publication of the Flora of Aldabra may be proceeded with separately before the end of the present year. In connection with this a few additional descriptions have come to light, and these it seems desirable to publish, as some of the names have already got into circulation.

Vitex Hornei Hemsl. (*Verbenaceæ*); species ex affinitate *V. leucoxylonis* L.

Arbor magna (fide Hornei) ramulis florigeris crassiusculis rigidis rectis compressis, petiolis petiolulisque primum glauco-pulverulentis. Folia digitato-quinquefoliolata, ramorum sterilium ampla, florigerorum minora, omnia longe petiolata, glabra vel cito glabrescentia; foliola longiuscule petiolulata, coriacea, oblanceolata, obovata vel fere oblonga, cum petiolulis 5–30 cm. longa, deorsum attenuata, apice rotundata, nonnunquam abrupte obtuseque acuminata, margine crispato-crenulata; venæ primariæ laterales utrinque circiter 9, sat conspicuæ; costa valida, supra impressa, subtus elevata; petioluli canaliculati; petioli usque ad 15–20 cm. longi, in ramis florigeris 6–10 cm. longi. Cymæ ferrugineo-puberulæ, compositæ, circiter 5 cm. diametro, densæ, in axillis foliorum supremorum pedunculatæ, quam folia breviores; bracteæ lineares vel filiformes, 2–5 mm. longæ. Flores parvi, numerosi, brevissime pedicellati. Calyx pubescens, campanulatus, 3–4 mm. longus, brevissime 5-dentatus. Corolla ventricosa, extus dense tomentosa, circiter 1 cm. longa, oblique bilabiata, labii inferioris lobo intermedio multo majore orbiculari-crispato, intus antice hirsuto. Stamina vix exserta, filamentis basi fimbriatis. Stylus glaber, inclusus, breviter bifidus. Drupa oblonga vel ellipsoidea, 2–2·5 cm. longa, calyce brevi subtenda, endocarpio osseo obscure 4-sulcato. *Vitex* species unnamed? Baker, *Flora of Mauritius*, 256.

Mahé: A large tree common in many parts on the shore, *Horne*, 547; Cascade Estate, *Thomasset*, 124; *Gardiner*.

Justicia Gardineri Turrill (*Acanthaceæ*); species *J. matamensi* Oliver affinis sed caulibus erectis simplicibus, foliis apice attenuatis utrinque puberulis, spicis densioribus distinguitur.

Caules erecti, simplices, superne minute puberuli. *Folia* lanceolato- vel ovato-elliptica, apice attenuata, subobtusa, basi subacuta vel fere rotundata, petiolo 2 cm. longo dense puberulo excluso usque ad 10 cm. longa et 3·5 cm. lata, costa et nervis lateralibus utrinque circiter 8 pagina utraque prominentibus subtus præcipue dense puberulis. *Spicæ* in foliorum superiorum axillis 2–3-aggregatæ vel solitariæ, secundifloræ, pedunculo 1·5 cm. longo incluso circiter 3 cm. longæ, dense puberulæ; bracteæ oblongo-lanceolatæ, acutæ, 5 mm. longæ, 1·25 mm. latæ, puberulæ, ciliatæ; bracteolæ lanceolatæ, acutissimæ, 3 mm. longæ, 0·5 mm. latæ, puberulæ, ciliatæ. *Sepala* 5, inter se plus minusve inæqualia, lanceolata, acutissima, puberula, ciliolata. *Corolla* 6 mm. longa, extus puberula, labio antico trilobato 3·5 mm. longo, postico leviter emarginato 2·25 mm. longo. *Stamina* duo, antheris bilocularibus, loculis inæqualibus, inferiore distincte calcarato. *Discus* irregulariter lobatus, glaber, 0·75 mm. altus. *Stylus* dense puberulus. *Capsula* cylindrico-ellipsoidea, apice attenuata, acuta, puberula.

Silhouette. A common herb in moist places of cultivation, *Gardiner*, 112.

Riseleya Hemsl. Genus novum Euphorbiacearum, ex affinitate Uapacæ, a qua differt imprimis perianthii (involucri?) segmentis 4 decussatim valvatis, staminibus 30–40 et ovarii rudimento in flore masculo nullo.

R. Griffithii Hemsl. Species unica. Arbor mediocris, pulchra (fide Dupontii), præter flores glabra, ramis florigeris crassiusculis arcuatis, cortice cinereo rugoso. Folia alterna, coriacea, rigida, breviter petiolata; lamina oblongo-elliptica, sæpius 10–20 cm. longa, obtusa, utrinque plus minusve rotundata, supra nitida, subtus venis reticulatis sat conspicuis; petiolus validus, 1–1·5 cm. longus. Flores dioici, sericeo-tomentosi, circiter 1·5 cm. diametro, pedicellati, in axillis foliorum solitarii vel fasciculati, pedicellis pubescentibus 1–2 cm. longis. Perianthium (involucrum?) coriaceum, 4-partitum, segmentis decussatim valvatis (2 exterioribus 2 interioribus) crassis orbiculari-spathulatis. Flores masculi: stamina circiter 35–40, libera vel obscure fasciculata, fasciculis perianthii segmentis oppositis. Discus ad squamas parvas (an nectariferas?) redactus, inter perianthii segmenta et stamina enatus. Ovarii rudimentum nullum. Flores feminei: Discus annulatus, angustus, hirsutus. Staminodia nulla. Ovarium sæpissime biloculare, tomentosum; stigma sessile, carnosum, sæpissime bilobatum, lobis amplis reniformibus grosse fimbriatis. Ovula in quoque loculo 2, collateralia, ab placenta carnosa pendula. Fructus fulvo-tomentosus, carnosus, 2-locularis et ovoideus, vel rarissime 3-locularis et globosus, 4·5–5 cm. diametro maximo; epicarpium coriaceum; mesocarpium scleroso-carnosum; endocarpium cartilagineum, nervosum. Semina oblongo-ovoidea, circiter 3 cm.

longa. Embryo centralis, rectus, albumen fere æquans; cotyledones foliaceæ, cordatæ; radicula brevis. *Uapaca Griffithii* Hemsl. MSS. in herbariis nonnullis.

Mahé: *T. Risely Griffith*, 1893; *Thomasset*, 157, 187.

Apparently this tree is confined to Mahé, where, according to Thomasset, it was formerly common in the mountains, though it escaped Horne and other early collectors. Specimens were first sent to Kew in 1893 by the Hon. T. Risely Griffith, then Government Administrator.

These specimens were in fruit and my colleague Mr. N. E. Brown provisionally referred them to *Uapaca* of Baillon, a genus restricted to tropical Africa and Madagascar. In 1903 I had to deal with fruiting specimens sent by Mr. Thomasset and I provisionally named the plant *Uapaca Griffithii*, and this name has a limited circulation, though a description of the plant has not hitherto been published.

In 1905 Mr. Thomasset sent to Kew excellent flowering specimens, both male and female, and from their structure I was led to the belief that this tree could not be included in the genus *Uapaca*. A more complete examination of the material has confirmed me in my opinion and I now name it in memory of the discoverer. Apart from the question whether the floral envelope is of the nature of an involucre or of a perianth, there are differences which I consider of generic value. But I regard the floral envelope of *Riseleya* as a true perianth. On the other hand, there is no doubt that it is an involucre in *Uapaca*, with several male flowers within each involucre; each male flower being provided with a small perianth and a central pistillode. The involucre of *Uapaca* consists of five, or more, imbricate segments: whereas the perianth of *Riseleya* both of male and female flowers is composed of four parts in opposite valvate pairs. The stamens are grouped in almost linear, not circular, clusters, opposite the perianth segments, with a very small (nectariferous?) scale between the stamens and the segments. The centre of the concave hairy torus is otherwise bare.

I have placed *Riseleya* near *Uapaca* more, perhaps, on account of its former association than its real affinity, yet I do not know of any better position for it among the genera having geminate ovules.

Phyllanthus Schimperianus Hemsl. (*Euphorbiaceæ*). Arbor communis (fide Thomasset) ramis rigidis rectis glabrescentibus; ramuli laterales floriferi, graciles, pubescentes, internodiis quam folia multo brevioribus. Folia breviter graciliterque petiolata, tenuissima, papyracea, disticha, oblonga vel elliptico-oblonga, usque ad 2 poll. longa, sed plerumque minora, utrinque rotundata, apice nunc minute apiculata nunc obscure emarginata, subtus pallida, venis tenuissimis eleganter reticulatis. Flores utriusque sexus intermixti; masculi pentandri; feminei staminibus imperfectis muniti. Capsula ignota.

Mahé: Capucin at 1000 ft., *Dupont*; without locality, *Thomasset*, 28.

Specimens of this *Phyllanthus* formed part of a small collection of Seychelles plants made by Mr. H. P. Thomasset for the late W. Schimper, botanist to the German Deep-Sea Expedition, who sent the plants to Kew in 1901 for identification and description. This task was given to me and I furnished a report on the same in 1902 for publication; but I believe it has never appeared.

Dioscorea nesiotis Hemsl. (*Dioscoreaceæ*); species ex affinitate *D. Tysoni* Baker (Africæ australis incola), a qua differt omnino glabra, floribus minoribus.

Herba tuberosa undique glabra, caulibus scandentibus gracillimis monocarpicis. Folia alterna, cum petiolo gracili usque ad 10–12 cm. longa, 3–5-foliolata; foliola tenuissima, subsessilia, ovato-oblonga, 2–8 cm. longa, acute acuminata, venis inconspicuis. Flores unisexuales, ut videtur, dioici, minimi, simpliciter racemosi, racemis axillaribus solitariis vel interdum binis breviter pedunculatis, masculinis quam femineis brevioribus axi per anthesin fere capillari: flores masculini distincte pedicellati pedicellis bracteis æquilongis acutis subtendis. Perianthii segmenta fere libera, circiter 1·25 mm. longa, ovali-oblonga, apiculata. Stamine 6, filamentis brevissimis. Flores feminei perfecti non visi. Perianthii segmenta oblonga 1·5–2 mm. longa. Racemi fructigeri 15–20 cm. longi, densi. Capsula 3-alata, alis fere semiorbicularibus circiter 1 cm. latis. Semina orbicularia, compressa, circumcirca ala membranacea cincta.

Aldabra: *Thomasset*, 218, 241.

The same species was collected in Assumption by Dupont, 118.

BIBLIOGRAPHICAL NOTES.

LXIX. The Page-heading of Periodicals.

In three of the earlier notes in this series (Journ. Bot. 1894, 180, 274; 1896, 168) I dealt with certain points in connection with the dating and indexing of periodicals which seemed to demand attention. The suggestions made in the two former of these were, as I was able to say when writing the last of them, in so many cases acted upon that I am venturing now to add a note on another matter relating to periodicals which may perhaps prove equally useful.

At the outset, as in the previous cases, it would seem that no suggestions could be necessary: it might have been expected that custom would have long since decided upon the most convenient and most useful way of indicating the contents of a periodical, and that there was little room for difference of opinion and of practice. This would seem to be especially true in the case of page-headings; and the fact that even in so simple a matter so great a variety exists can only be explained by the natural tendency of the human mind to variation, for it can hardly be supposed that the diversity is intentional.

As has been more than once pointed out in this Journal in the course of book-reviews, the blank space at the top of each page, necessitated by the page-number, affords an opportunity for conveying information as to what stands below it. An inspection of botanical periodicals printed in English, with which alone this note is concerned, shows that in many instances this opportunity is wholly or in part neglected, and it may be that, attention being called to it, the omission will in future be supplied.

The periodicals which make the fullest use of this space come to us from the States: the *Botanical Gazette* (Chicago), *Rhodora* (Boston) and the *Annals of the Missouri Botanic Garden* (St. Louis), when opened, supply at a glance all the information that can be required: on the left-hand page the title of the periodical; on the right the name of the author, followed by the title, or an abbreviation thereof, of the paper which appears below: the month and year of publication face each other in the junction of the two pages. The placing of the title of the periodical on the left-hand page is in accordance with recognized rule, and in the case of separate copies is a manifest convenience.

It may be of interest to show how far botanical periodicals printed in English avail themselves of the opportunity which page-headings provide; and I have therefore drawn up the following table, in which is entered the title of the periodical, the name of the author, the subject of the paper, and the date of publication: except in (8), where the order is reversed, the author's name when given is on the left-hand page, the subject on the right. The absence or presence of each particular is indicated by o or ! respectively. The titles are arranged alphabetically: the *Botanical Magazine* and *Icones Plantarum*, coming as they do in a somewhat different category, are referred to later; the American periodicals already mentioned do not appear.

	Periodical.	*Title.*	*Author.*	*Subject.*	*Date.*
1.	American Journal of Botany	o	!	!	o
2.	Annals Bolus Herbarium	o	o	!	o
3.	Annals of Botany	o	!	!	o
4.	Annals of Peradeniya Garden	o	!	!	o
5.	Botanical Journal	!	o	o	o
6.	Bulletin of the Torrey Club	o	!	!	o
7.	Journal of Botany	!	o	!	o
8.	Journal of the Ecological Society	o	!	!	o
9.	Journal of the Kew Guild	o	o	o	o
10.	Journal of the Linnean Society	o	!	!	o
11.	Kew Bulletin	o	o	o	o
12.	New Phytologist	o	!	!	o
13.	Notes of the Edinburgh Botanical Gardens	o	!	!	o
14.	Orchid Review	!	o	o	!
15.	Proceedings of the Linnean Society	!	o	o	o
16.	Records of the Botanical Survey of India	o	o	!	o
17.	Torreya	o	o	o	o
18.	Transactions of the Botanical Society of Edinburgh	!	o	o	!
19.	Transactions of the Linnean Society	o	!	!	o

It is a matter of surprise that the periodical publications associated with Kew should, with the exception of the *Orchid Review*, be unsatisfactory in respect of headings. The *Bulletin* places at the head of its pages nothing but the number, and the *Journal of the Kew Guild* follows this example. Even worse is the issuing without lettering (save for the number) of the plates of the *Botanical Magazine* and the *Icones Plantarum*, which bear neither the name of the plant figured nor any indication of the periodical in which they appeared, nor the date of their appearance. The accompanying letterpress is in the former particular equally deficient, and although in Bot. Mag. the date is supplied, it is absent from the *Icones*. In the latter case the omission is especially unintelligible, as under the editorship of J. D. Hooker (1867–89) and D. Oliver (1890–98) the plates were lettered; the omission of this useful detail, to which I at the time called attention, began with Sir W. Thiselton-Dyer's editorship and continues to the present. The inconvenience of the method, especially for those who make collections of botanical plates, is obvious; in such cases each plate has to be written up with name and reference, and, if encountered apart from its wrapper or letterpress, its source is not easy to identify.

It may be noted that in (3) the author and subject are when space allows indicated on both pages—the titles of the papers are given at length; in (4) the surname of the author only is given; in (8) the author's name (in capitals) appears on the left-hand page, the subject (in italics) on the right; in (10) and (19) the author and subject run across both pages, the former being prefixed by "Mr." or the like. In (16) the date of the years to which the *Proceedings* relate should certainly be placed at the head of the pages—every one who has had occasion to refer frequently to bound-up volumes must have felt the great inconvenience of this omission: (17) shares with the Kew publications which are discussed above the unenviable distinction of giving no information in its headings, so that we have from the States the worst as well as the best examples: (18) gives at the head of its pages the number of the session and the year to which the matter beneath relates.

Placing the four points indicated in the order of their importance, it would seem that in headings the indication of subject stands first and that of date last: this can usually, without inconvenience, be gathered from the wrapper. The name of the periodical is important in the case of "separates," the distribution of which is fairly general, sometimes in plain wrappers which give no definite indication of their provenance. In connection with reprints, one is glad to notice that the practice of repaging these is becoming less frequent.

It has always seemed to me that when a page contains the conclusion of one article and the beginning of another the heading should relate to the former—*i. e.* to that which comes immediately below it: this arrangement, though adopted in this Journal, is not, I think, in accordance with general practice.

It may be noted here that the very worst example of unsatisfactory arrangement with which I am acquainted is that furnished by the 'Register' to the volumes of *Das Pflanzenreich*. The name of the genus—which in almost every index, whether of monograph or flora, is placed at the heading of each column—is here always omitted, so that it is necessary to find the first (and only) entry of the genus before it can be ascertained to what the species belong. Thus in the volume before me, thirteen pages are occupied by the names, in three columns, of species of *Dendrobium*; the name of the genus appears only in the first column. The typographical arrangement of the columns also differs inconveniently from the ordinary practice by which synonyms are in italic and accepted names in roman: in *Das Pflanzenreich* all are in roman, accepted names being indicated by an asterisk.

JAMES BRITTEN.

SHORT NOTES.

APLOZIA RIVULARIS Schiffner IN S. LANCASHIRE (V. C. 59). Mr. H. C. Broome and I visited Bamford Wood, Ashworth Valley, in July to find *Nardia obovata*, discovered many years ago by Mr. G. A. Holt, and were fortunate in meeting with a little of it. On the damp shaley rocks by the side of the stream Mr. Broome collected a small *Aplozia* that proved to be the paroicous *A. rivularis* Schiffner which is new to the county. Possibly the *Aplozia riparia* (Tayl.) recorded in the *Flora of Ashton-under-Lyne* from Bamford Wood may be the same, as probably the species growing on shaley rocks as *A. riparia* will prove to be *A. rivularis*: specimens collected near Hayfield, Derbyshire, on similar rock as *A. riparia* are *A. rivularis*. *A. pumila* (With.), of which *A. rivularis* is regarded by some authorities as a variety, has a much narrower perianth and other features which to my thinking separate it from that species, although it agrees with it in its paroicous inflorescence. Even when neither subaquatic or aquatic *A. rivularis* retains, more the character of *A. riparia*.—W. H. PEARSON.

DEYEUXIA NEGLECTA Kunth. Mr. Lillie of Caithness has sent me specimens of this from Loch Watten, which are very different in appearance from the ordinary type, and answer well to the *Arundo sericea* (*A. stricta* Timm.) var. *angustata* of Wahlenberg (Fl. Lappon. 1812, 28) which is described as "panicula elongata lineari, floribus linearibus"; I have also var. *viridis* (Torges in Asch. & Graebn. Syn. Fl. Mitteleur, II. i. 208: 1899) from West Norfolk, sent by Mr. F. Robinson. The flowers vary greatly, even in the same panicle. The character drawn from the relative length of the hairs at the base of the florets as half or three-fourths is apt to mislead: Anderson more carefully says (*Gramineæ Scandinaviæ*, 88) "flosculus glumis parum brevior," which covers nearly every state of the British plant. In the detailed description in *English Botany* (ed. 3, xi. 56: 1872) the structure of the stems is not noticed. It is like a fluted column (about 20 flutes) each flute having reversed stiff hairs; these however are caducous. In American Floras, the stems are described as "glabrous," smooth throughout"; but this is not so in the early stages, the stems being quite rough, at least in British specimens. The nomenclature is also by no means settled, as correspondence with Mr. A. J. Wilmott and Dr. Stapf shows. The latter remarks that "it is by no means certain our species corresponds with the Central European, or the Scandinavian plant. In fact the whole genus wants a careful revision, and recasting. No two authors agree as to the limitation of the species, or what are and what are not hybrids." The name *neglecta* was first used by Ehrhart in his *Calamariæ* No. 118, Dec. 3 (1786)—one of seven sets of dried specimens which he issued in 1780–93: he again (under *Arundo*) uses it in his *Beitrage*. vi. 137 (1791).—Arthur Bennett.

Liparis Loeselii (p. 240). The following reference to the finding of this plant by Pitchford occurs in a letter from T. J. Woodward to Smith, dated "Bungay, Oct. 11, 1787":—"You will be glad to hear that Crowe found three specimens of *Ophrys Loeselii* on St. Faith's Bogs this summer: they were far distant from the spot on which Pitchford found his, and Crowe left them untouched; they were growing on the very wettest part of the bog, and actually in the water. Mr. Sole of Bath has found several on Hinton Moor near Cambridge, where Ray mentions their growing. Roots have been sent to Curtis and to Dickson, and are grown in Curtis's and the Museum Garden" (Memoir of Sir J. E. Smith, i. 275).—Alice M. Geldart.

REVIEWS.

Fossil Plants, Vol. III. Pteridospermeæ, Cycadofilices, Cordaitales and Cycadophyta. By A. C. Seward, M.A., F.R.S., pp. xviii + 656 with 253 illustrations. Cambridge University Press, 1917, 18*s*. net.

Although the author apologizes for the delay of nearly seven years since the publication of the last volume of this well known work, the resulting compensations more than atone for the period of waiting. For during the interval, research on the groups with which Prof. Seward here deals has been especially prolific, as can be gleaned from a perusal of the excellent bibliography; this comprises considerably over a thousand references, of which nearly a quarter are contributions that have appeared since 1910. In this connection it may be said that we have encountered few works of such a comprehensive character which are so well abreast of the pertinent research at the time of publication. In subjects replete with controversial matter the treatment is singularly impartial, even where one would have welcomed an expression of the author's own views.

The first chapter is occupied by a *résumé* of the more important characters of the living Cycadales, a fitting and essential introduction to the fascinating synthetic group of the Pteridospermeæ to which the three succeeding chapters are devoted. The Pteridosperms are subdivided into the Lyginopterideæ, the Medulloseæ, and the Steloxyleæ, and it will be noted that the author, in accordance with the rules of nomenclature, has adopted Potonié's generic name of *Lyginopteris* in place of the more familiar *Lyginodendron* of Binney.

In the Cycadofilices seven families are recognized, viz. the Megaloxyleæ, Rhetinangieæ, Stenomyeleæ, Cycadoxyleæ, Calamopityeæ, Cladoxyleæ, and the Protopityeæ. All of these are based on stem structure and exhibit Pteridosperm affinities, but the reproductive organs are at present unknown.

The Pityeæ occupy some fifteen pages which should prove invaluable to students in this field, especially as some of the literature is not readily accessible.

The Palæozoic Gymnospermous seeds receive adequate treatment and are separated into three groups, viz. the Lagenostomales, the Trigonocarpales, and the Cardiocarpales. Particularly good summaries are given of the principal characters of each genus. We may however note that in describing the basal chamber of *Polylophospermum* comparison is made with "*Trigonocarpus Oliveri*." But the supposed basal chamber of the latter was merely an effect of obliquity of section in the lower part of the sclerotesta and had no real existence.

The absence of co-ordination between the families based on vegetative and reproductive material and upon impressions and petrifactions is largely a necessary concomitant of the imperfection of our knowledge. But though it would perhaps as yet be premature to attempt any merging of, for example, the Neuropterideæ, Medulloseæ, and Trigonocarpales, or the Sphenopterideæ, Lyginopterideæ, and Lagenostomales, yet one would have preferred an arrangement by which these relationships were brought into greater prominence. In addition a more copious use of cross-references would have been advantageous.

The final chapters on the Cycadophyta embrace a very useful account of our present knowledge of the Bennettitales, in general, and of the genera *Cycadeoidea* and *Williamsonia* in particular.

It is scarcely necessary to add that, like its predecessors, this volume forms an indispensable adjunct to all whose studies lie in this direction. The numerous well chosen and excellently reproduced illustrations contribute in no small degree to the usefulness of the book. In reference to the method of production we would however add one word of minor criticism. In view of the dissimilarity in size between volumes I. and II. it is unfortunate that the publishers should have reverted in the present volume to the earlier type. A greater uniformity throughout the series in this respect would, we feel sure, be generally appreciated.

E. J. S.

Name this Flower. By GASTON BONNIER. Translated and adapted from the French by G. S. Boulger, F.L.S. Fcap. 8vo, pp. xii, 331, 64 plates. Dent & Sons. 6*s.* net.

THE combination of the well-known method of the dichotomous key with illustrations of each alternative wherever necessary is novel in this country. M. Bonnier's works have long been known and used, but though the method removes the greatest objection to the ordinary "keys," viz. that a single small error sets one travelling farther and farther from the correct name, it has yet to be applied to the British flora. The statement on the wrapper of this translation, which has been very carefully done, of *Les Noms des Fleurs*—that it includes "all the plants and flowers found in France, Belgium, Switzerland, and England, and in general all the common plants and flowers of Europe"—is, of course, one of those exaggerated inaccuracies that the general publisher seems to permit himself only in respect of matters scientific: the plants included are those generally distributed over the plains of Western Europe, those of mountains, seashores, etc. being omitted. The book should be found useful by those of our soldiers in France who would like to know the names of the plants they see, and especially to colonials who know none of the common plants of Western Europe. By the use of simple English and the almost complete abolition of technical terms the business of identification is brought within the reach of the veriest novice, who may feel that the somewhat high price is worth paying for that alone. We do not, however, think that such common technical terms as "composite" should be given (p. 205) a general meaning: some other word should have been found.

Nearly half of the 700 species dealt with are figured in colour on 64 plates. Some of the figures are rather crude and vague, but they should be quite sufficient to show whether the plant has been named correctly. The main system of nomenclature is in English, made uniform by the use of vernacular "generic" names with a qualifying adjective obtained (usually) from the scientific name given. We are afraid that uniformity is as difficult to obtain in English as in scientific names; made on this plan, they will be just as liable to change. But it seems on the whole a good effort, and were the book a British Flora suitable for general use might have a stabilising effect. The suggestions for drying plants are rather primitive: ordinary newspaper will serve much better than the pages of an encyclopædia. The print is good, but the woodcuts are not always clear. The book is well indexed, considerable information concerning the plants being given in the first index. It is doubtful how far the mere knowledge of the names of plants is valuable, but as considerable observation is required in working these out even on this simple plan, it will provide a foundation which should serve as an introduction to a more serious flora. The "simple way" itself is adequately explained and illustrated by examples, and, as M. Bonnier remarks, it is for the readers to decide if he has succeeded.

A. J. W.

Plants Poisonous to Live Stock. By HAROLD C. LONG, B.Sc. (Edin.). Royal 8vo. Pp. viii, 119. With Frontispiece. Cambridge Agricultural Monographs, Cambridge University Press. Price 6*s.*

ALTHOUGH this little volume can scarcely be dignified by the name of monograph, its author has rendered a great service in setting in a certain order the principal points of an intricate subject of incalculable practical importance. Above all, the indications to the bibliography of the subject, contained in a list of 267 works at the end to which reference is made constantly throughout the text, is of especial value, and goes to confirm Mr. Long's statement in the Preface, that his task "has involved considerable labour extending over several years." Considering the special nature of the subject, the book is as readable and interesting to a general reader as it is unserviceably bound, in boards; and the type is as clear as the paper is indifferent. The arrangement of the work is admirable; with the help of the clearness of the paragraphing and the completeness of the index at the end, any desired subject is readily found. The work begins with an introduction in the form of a general chapter, dealing with the various aspects and consequences, legal, pathological, and otherwise of poisonous plants. The next six chapters deal with the various plant families in order—fungi, it is suggested, must be treated in a separate volume. Another chapter is devoted to the effects of plants on milk. Finally, poisons are classified according to their effects. To the general account of each poisonous plant is added a chemical account, when possible, of the toxic principle, and also the symptoms of the poisoning, where these are known. In association with the author's previous manual in this series (*Common Weeds of the Farm and Garden*), the present volume should be of value, not only to the student of this branch of agricultural research—an audience unhappily small—but to the intelligent practical cultivator.

H. F. W.

BOOK-NOTES, NEWS, ETC.

NATHANIEL LYON GARDNER publishes a first instalment of *New Pacific Coast Marine Algæ* (University of California Publications, Botany, vi. no. 14, pp. 377–416, 1917), which comprises descriptions of two genera, eight species, and two forms, all new to science. Of the three Chlorophyceæ treated, *Arthrospira maxima* is remarkable for thriving in sea-water used for condensing steam in an electric power-house and hence subjected several times daily to a rise and fall of temperature, from 60° C. down to the temperature of the outside reservoir. *Chlorochytrium Porphyræ* is an endophytic unicellular green alga which occurs in myriads within the thick gelatinous walls of *Porphyra*; its life-history and affinities are discussed at length. *Gayella constricta* grows associated with *Prasiola*, but is distinctly not a metamorphosed form of the latter, despite the views of some authors. Of the brown algæ, *Sargassum dissectifolium* is demonstrated to be distinct from the Japanese *S. piluliferum*, to which it had been referred. *Cystoseira neglecta* had previously been known by floating fragments only, and has now been traced to Santa Catalina Island. The limits and distinguishing characters of the genera *Cystoseira* and *Cystophyllum* badly need to be critically revised. The red algæ are of much interest. *Petrocelis franciscana* is the most abundant rock-encrusting alga on the Californian coast, and had been wrongly referred to *P. Middendorffii* of the Ochotsk Sea. *Hildenbrandtia occidentalis* is also an encrusting alga widely distributed along the coast; and the ample fruiting material that has been collected permits it to be adequately described; but there is still some question whether it be generically distinct from *Besa* Setchell (1912). *Coriophyllum expansum* is an encrusting alga of leathery texture, forming a new genus placed provisionally in the Squamariaceæ until its sexual organs are discovered. *Cumagloia Andersonii* has hitherto been regarded as a species of *Nemalion*, but is now made the type of a new genus owing to the method of origin and the structure of the cystocarp. The paper is written with critical skill, and is a very welcome addition to algological literature. It is furnished with five plates.—A. G.

The *Bulletin of The New York Botanical Garden*, vol. viii, no. 31, issued 10 July, contains a paper by Robert S. Williams on Philippine Mosses (pp. 331–378) collected by himself (1903–5) on the islands of Luzon and Mindanao, which comprises 240 species in 118 genera. Three genera—*Rhabdoweisiella*, *Pseudopohlia*, *Stereodontopsis*—and twenty-seven species are described as new, and figured. *Pleuropus appressifolius*, a new species, is also figured. This excellent list should prove of great assistance to future students of the Moss-flora of the Philippine Islands.—A. G.

In the *Annals of Botany* for April (issued in July) Dr. J. C. Willis, in a paper entitled "The Relative Age of Endemic Species and other Controversial Points," replies to Mr. Ridley's criticisms on his previous work, to which we referred on p. 119. Dr. Willis adduces evidence "to show that the endemic species are on the whole the youngest, not the oldest, in a country . . . . Mr. Ridley's objections to the Mutation theory are then considered, and it is shown that the supporters of Natural Selection do not clearly distinguish between *post hoc* and *propter hoc*. Natural Selection cannot explain the origin of the peculiarities which distinguish plants, but can only preserve or destroy them when once formed. The reply of the Natural Selectionist to queries invokes incomprehensibility, as did formerly that of the Special Creationist." Dr. Willis's paper is followed by one by Mr. Edmund W. Sinnott of the Connecticut Agricultural College on "The 'Age and Area' Hypothesis and the Problem of Endemism." "Dr. Willis's 'age and area' hypothesis assumes that the area occupied by a species depends primarily upon its age (the older the species, the wider its range); and that 'dying out' of species occurs very rarely": against this Mr. Sinnott raises various objections. In the same number of the *Annals* is a long and interesting biography, with bibliography, of the late H. H. W. Pearson, from the pen of Prof. Seward.

Gardening books do not strictly come within our purview, but a word may be said about Mrs. Stebbing's little volume entitled *The Flower Garden and How to Work in it* (Jack, 1*s.* 6*d.*) which is not only a useful but a very cheap and pretty little book. The directions under the various months, beginning with May, are simple and practical, and the selection of flowers is evidently the result of experience and knowledge. Unfortunately the latter does not extend to their names, which, as is frequently the case in flower-books, are often misspelt: thus we have in one sentence "the St. Daboc's Heath, sometimes classed as *Menzesia*, sometimes as *Duboëcia*" (p. 78). The printer cannot be responsible for the mistakes, as the same occur throughout. The index also needs revision: sometimes the Latin name is indexed with cross-reference to the English, sometimes the opposite course is adopted, and the names are entered under their adjectival prefix: thus we have "Spotted Lungwort (*Pulmonaria*)"—in this instance misleading, as the best species, *P. azurea*, referred to in our last issue (p. 237) has unspotted leaves. The book, which is copiously illustrated from photographs and by pretty little figures in the text, is so attractive that a reprint is certain to be called for soon, and it would be worth while to revise it in the directions indicated.

A CONTRIBUTION TO THE PHYTO-GEOGRAPHY OF BELLENDEN-KER.

I. INTRODUCTION. By L. S. Gibbs, F.L.S.

In March 1914, proceeding from Dutch N.W. New Guinea to Sydney *viâ* Macassar, I stopped at Cairns in N. Queensland, for the purpose not only of ascending Bellenden Ker, 5400′, the highest mountain in the country, but also of spending some weeks at Kuranda, at 1000′, on the Barron River, to enable me to form some idea of the vegetation in this outlying portion of the Malayan-Papuan floral region.

Both these localities had been visited by Dr. K. Domin, of Prague, during his long stay for botano-geographical work in N. Queensland. I was indebted to him for a most interesting account of the fine mixed forest, of which in present times the heavy rainfall permits the development in this comparatively small N.E. corner of the Australian continent, but which, as Domin rightly states, "is only a small remainder of a flora spread formerly over large areas, now mostly sunk under the sea"*.

As March is the height of the summer or rainy season in these parts, it was not considered a very propitious time for work on Bellenden Ker, all previous ascents having been made in the winter or dry season. The relatively high number of new species obtained is possibly attributable to this fact.

A spell of fine weather prevailing at the time decided me to proceed at once to Harvey's Creek in the Mulgrave valley, the base from which the highest or central peak of the Bellenden-Ker range is most accessible. Here, the enterprising landlord of the local hotel very kindly making all arrangements for me, I was enabled to start the third morning after my arrival, accompanied by Claude, the small son of the house, a very enthusiastic companion, and four natives or "blacks" as they are generally but not very correctly called, to act as guides and carry tent, provisions and possible botanical booty. This last, owing to the sterile nature of the granitic shallow soil, and consequently limited character of the vegetation, proved very much less than my Papuan experiences had led me to anticipate. The altitude of the mountain being low, and a break in the fine weather to be expected to any moment, arrangements were made to spend only one night on the summit.

The forest round the base had all been worked through in the interests of the lumber industry, the cutting out of the finest trees resulting in a vigorous young sapling upgrowth of miscellaneous character, through which old logging tracts spread in all directions, enabling horses and cattle to graze through.

Further on, up the gradual lower slopes of this range, of which the poor and sterile character of the soil surprised me, the crowns of the slender forest trees just meet overhead, with a light sapling substaging, quite easy to penetrate. Here the undergrowth consists principally of the very general endemic tree-fern *Alsophila Rebeccæ*, with entire pinnules, a *Macrozamia*, and the peculiar *Bowenia spectabilis* in very young examples, only showing simple branches like deltoid fronds in appearance. A graceful little palm, *Bacularia minor*, about 3 metres high—with stems as thick as a walking-stick, the red fruit crowded at the apex of flexible peduncles which radiate beyond the leaves,—was a very common representative of an Indo-Malayan and Papuan genus. *Mackinlaya macrosciadea*, a slight undershrub, 2–3 m. high, with light green foliage and flowers and white fruit, was also common—a Papuan species which here reaches the limit of its distribution, recalling the closely allied *Anomopanax arfakensis*, equally abundant in the Arfak Mts. of N.W. New Guinea, in habit and colouring, the latter, however, with green fruit.

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* Karel Domin, "Queensland's Plant Associations" in Proc. Roy. Soc. Queensland, xxiii. 72.

Always rising, we crossed two fine torrents with the widely spread *Angiopteris evecta* on their banks, also at the limit of its distribution. The native name means Water-fern, as it only grows in N. Queensland along water-courses *. On a rock overhanging the second stream, at about 1000′, the very pretty *Bœa hygroscopica*—representing the last outlier of a family widely spread in India, Malaya, China, New Guinea and the Solomon Islands—formed an unexpected patch of bright purple colour.

Behind this stream the ground, always exposed and sterile in character, rose much more steeply, with the *Macrozamia*, *Bacularia* and *Mackinlaya* still conspicuous amongst the scanty undergrowth. Swinging sharply to the left we passed up some slopes of loose dry soil and leaves, open enough a afford a view over the Mulgrave River valley and the hills bordering to the south; then turning sharply to the right we stepped on to a long ridge plateau about 2000′, running apparently east to west and quite different in the character of its vegetation.

A most delicious scent made me hunt round till I found a group of *Randia disperma*, a bushy shrub about 3–4 m. high, with dark green leaves, bearing very few of the delicate long, tubular, white flowers, of which the extreme edges of the corolla lobes are very densely crisped—an unusual feature in the genus, Mr. Moore tells me. Slender trees of *Brackenridgea australiana*, with ascending branches covered with the striking fruit, consisting of largish blue-black seeds borne on red enlarged calyx-leaves; *Garcinia Gibbsiæ*, with green flowers turning brown later, and the white-flowered *Symplocos Thwaitesii* were the dominant substaging species in flower under the slender forest trees.

On this long ridge *Alsophila Rebeccæ* persisted, but the smaller *Bacularia Palmeriana* from this point replaces *B. minor*, which it resembles in appearance, the leaves being less pinnate and more approaching the youth form.

The comparatively level surface of the plateau ridge was covered with broken granite over which small mosses and epiphytic ferns spread luxuriantly, the handsome *Hymenophyllum Baileyanum* being general. Interspersed amongst the stones *Marattia fraxinea* with *Blechnum Whelani** were the commonest terrestrial ferns, the latter of rosette habit, the fertile fronds, with much narrower pinneæ, rising above the larger sterile ones. This species, the Rev. W. W. Watts informed me at Sydney, had not been re-collected since its original discovery by Bailey on this mountain *. The predominance of the few species present, combined with the absence of much epiphytic growth on the trunks of the trees, gives a non-tropical character to this undergrowth, of which the general facies is more suggestive of that of Devon or Cornwall woodlands.

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* R. H. Gambage, "Native Flora of Tropical Queensland" in Journ. Roy. Soc. N.S. Wales, xlix. (1915) 393.

Proceeding along the ridge, as the altitude increases the stones become larger and more piled one on top of the other, though still sheltering terrestrial ferns, with clumps of the sedge *Exocarya scleroides*; the spreading *Hymenophyllum Baileyanum* with the *Vittaria pusilla* var. *wooroonooran*, the widely distributed *Polypodium Billardieri*, and the endemic *P. simplicissimum*, only known from N. Queensland, were abundant on the rocks, occasionally associated with *Liparis reflexa*, a small orchid with cream flowers. At about 3000′ the undergrowth became denser and the trees smaller; *Alyxia ilicifolia*, with white flowers, was general, with *A. ruscifolia*—of denser habit and much smaller leaves and orange berries—which persisted to the top, as did *Symplocos Thwaitesii* and the ubiquitous *Mackinlaya*, *Bacularia* and *Alsophila Rebeccæ*.

After some climbing we emerged on to another shoulder of the mountain at 4000′, on the ultimate spur of which the camping-ground was reached, where the natives, after putting up the tent, expeditiously erected for themselves one of their neat "gunyas" or shelters, which look like inverted bowls. In this case the ribs were made of "lawyer canes," *Calamus australis* (Mart.) Becc.—which are about 3–4 cm. thick—arranged lattice-wise, tied with creepers, and then interwoven with palm leaves. Condemned to perpetual roving by the prevailing sterility of a country which in its whole length and breadth does not produce a single plant-food capable of cultivation, these natives, owing to the necessities of the nomadic habit, have never evolved a more stable form of dwelling. Nothing could demonstrate better the effect of environment on the development of a race than the contrast between the mountain Papuans with their well-built houses and wonderfully stocked gardens on the rich slopes of their native mountains, and these people, in intelligence certainly not behind the Papuans, driven to a nomadic existence by adverse conditions of habitat. Even in these hills the native Australian tribes were not helped by the heavy rainfall, as the slopes are too barren to admit of any cultivation, even had the ubiquitous sweet potato of other tropical countries been available.

Near the camp a group of a very fine Palm, *Arania appendiculata*, up to 8 metres in height—the leaves 3–4 m. long, with silver undersides to the pinnæ, showed some specimens just coming into flower, but I could only find ♂ plants, though Dr. Beccari informs me the ♀ alone had been previously collected. Amongst the dilated leaf-bases I had a hunt for a most extraordinary animal, like a glorified slug, the head being covered with tentacles which could be elongated or contracted at will, but the beast eluded me in the end. After dark, dead sticks on the ground, covered with luminous Bacteria, looked like threads of gold scattered round.

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* F. M. Bailey, 'Flora and Fauna of Bellenden-Ker Range,' Brisbane (1889), p. 77.

The next morning we started early for the summit, leaving one of the boys behind to keep camp, as cassowaries, wallaby, and even megapodes, or "brush turkeys" as they are called here, can be very inquisitive and destructive. The last seemed as general as in New Guinea, judging from the huge piles of leaves seen, in which they lay and incubate their eggs.

The final cone consists of a mass of rock, overgrown with vegetation quite different in type from that of the lower levels, though many of the prevailing species are identical. Small trees, branching copiously from the base, grow densely, but by no means impenetrably, together, while the monotony in the epiphytic fern-flora—the species previously mentioned apparently predominating—with the dearth of epiphytic orchids is very obvious; a couple of examples of *Liparis reflexa* were collected on rocks. It forms a wind-swept scrub very like the plant-covering of Lord Howe's Island, some of the species indeed, like *Alyxia ruscifolia*, being common to both formations, while the generic relationship is very close.

The small trees grow too closely together to allow of much undergrowth. A clump of the handsome red fungus *Clavaria aurantia* was found towards the base, so named from the dried specimens, which turn a dirty orange in colour, shrinking to about a quarter of the original size; tufts of *Exocarya scleroides* persisted between the moss-grown tree stems.

The dwarfed and scrubby trees were still largely composed of the two *Alyxias* already mentioned; *Eugenia erythodoxa*, from 4500′ to the top, had largish flowers of a charming rose-pink colour; *Mackinlaya macrosciadea* and many examples of the small *Bacularia* about 1 m. high, still fruiting, but only showing the youth form of leaf. The palms, *Orania appendiculata* and *Calyptrocalyx australasica* ran up almost to the top; *Alsophila Rebeccæ* was still abundant, while the handsome *Alsophila Robertsiana*, 2 m. high, was seen in one example.

At 5000′ the famous *Dracophyllum Sayeri*, peculiar to this mountain, the only representative in Queensland of a genus widely distributed throughout New Zealand, with many stout much branched stems, formed a large part of the dense shrubbery marking the last 500′; the fine cream flower-heads, with pink bracts and the red fruit recalled *D. latifolium* A. Cunn. of the mixed forest regions of New Zealand. This genus will probably yet be found in New Guinea, which would explain its presence here; in fact, some plants in sterile condition, seen in the Arfak Mts. strongly suggested this family to me.

Drimys oblonga with red flowers was characteristic of the extreme summit with *Alyxia ruscifolia* and a *Psychotria* sp. not properly in flower. The stems of the small trees composing this dense scrub-growth were clothed in small mosses and hepatics, associated with the abundant little white *Dendrobium Taylori* and the minute *Bulbophyllum Lilianæ* with white petals and yellow labellum, growing tightly round the smallest branches. On the summit a small space had been cleared exposing the granite, where a large clump of *Gahnia psittacorum* *, so common in the Arfak Mts. of N.W. New Guinea, grew by the rock.

It was about 9 A.M. when we arrived, but there was only a restricted view, which soon clouded over, down the Mulgrave valley to the sea, and up it in the Mt. Bartle Frere direction. In the inevitable bottle our names, with those of the three boys who accompanied us, were written on the back of Mjöberg's record of his ascent, this indefatigable investigator having been the last to visit the mountain. The mentality of the Australian natives is supposed to be one of the lowest in the human scale, yet these men asked me to put down the name of the boy left at the camp, as it was not his fault he was not there as well †. Among the records of previous ascents I was interested to see Domin's card, but, being heavily glazed, it was already turning black, and had half perished. Dr. Mjöberg had made interesting notes on the temperature and atmospheric conditions prevailing at the time of his ascent.

Threatening clouds closing round did not allow much time to hunt for *Rhododendron Lochæ*, the only representative of this typical Malayan and Papuan genus in Australia; however, I heard later from Mr. Gambage that it is limited to the summit of one of the two other peaks of this range. We hurried down to the tent and had only just struck camp when rain fell in torrents, and persisted for the rest of the day, incidentally mobilising battalions of leeches. We returned to Harvey's Creek at about 4 P.M., when the plants obtained were arranged and packed, and I left the next morning for Kuranda.

The collection made at the latter place is included in this list, but, as most of my proposed work there was cut short by an attack of coast fever, I have nothing to add to Dr. Domin's account of his results in the same locality. Here, again, the unexpected number of new species found in such a frequented region is no doubt due to the fact that very little recent collecting has been done in N. Queensland during the hot or rainy season.

I am indebted to Mr. Spencer Moore for the systematic account of the phanerogams, with the exception of the Palms, which Prof. Beccari has kindly named, and the Orchids, which Dr. Rendle has undertaken. The Ferns have been named by Mr. Gepp—most of them were looked through by the Rev. W. W. Watts at Sydney, who suggested most of the names—and the solitary fungus by Mr. Ramsbottom. The plants themselves are in the National Herbarium. I regret that Dr. Domin's further publications in *Bibliotheca Botanica* have not been available for reference.

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* L. S. Gibbs, 'A Contribution to the Phytogeography and Flora of the Arfak Mts. etc.,' 1917, p. 35.

† *Cf.* Eric Mjöberg, "Svenska biologiska expeditionen till Australien, 1910–1911," in *Ymer*, xxxii. (1912) 431.

II. SYSTEMATIC ACCOUNT.

Phanerogams: by Spencer Moore, F.L.S.

Drimys oblonga, sp. nov. (*Magnoliaceæ*). Arbor parva, glabra; *ramulis* sat validis foliosis ancipitibus; *foliis* brevipetiolatis oblongis vel oblongo-ovatis obtusissimis basi obtusis coriaceis costis lateralibus supra parum eminentibus subtus impressis; *floribus* parvis axillaribus vel pseudo-terminalibus solitariis vel 2–3-nis; *pedicellis* gracilibus floribus circiter æquilongis; *sepalis* 4 inter se inæqualibus rotundatis crassiusculis; *petalis* 5 quam sepala longioribus suborbicularibus; *staminibus* paucis; *carpellis* solitariis truncatis.

Hab. Dense scrub on summit of Bellenden Ker, 5000 ft.; n. 6319.

Arbor sesquiorgyalis. Folia 5–6 cm. long., 18–25 mm. lat., supra in sicco fusco-grisea subtus dilute viridi-grisea; costa centralis pag. sup. eminens pag. inf. plana; costæ laterales utrinque 7–8; costa intramarginalis parum visibile; petioli crassiusculi, 3–4 mm. long. Pedunculi 3–10 mm. long.; pedicelli 2·5 mm. long. Flores rubri, 7 mm. diam. Bracteæ parvæ, ovatæ, crassiusculæ, summum 2 mm. long. Sepala 1·5–2·5 mm. long. et totidem lat. Petala 3·5–4 mm. long. et lat.

The mature flowers seen are but two in number and I have been able thoroughly to examine one only; this with its few and inconspicuous stamens may be functionally female. Only one carpel was discovered, but additional material may show this to be exceptional.

Besides the two-edged branches the foliage affords an easy means of distinguishing this species.

Garcinia Gibbsiæ, sp. nov. (*Guttiferæ*). Arbor glabra; *ramulis* ultimis sat tenuibus in sicco longitrorsum sulcatis; *foliis* oppositis petiolatis ellipticis sub apice sæpe breviter cuspidatis apice ipso mucronatis basin versus cuneatis costa media subtus optime prominente costis lateralibus valde numerosis sat prominentibus fere omnibus æque aspectabilibus sub angulo fere recto costæ mediæ conjunctis chartaceis; *floribus* 2–3-nis in fasciculas verisimiliter terminales breves digestis; *calycis* tetrameri paullo ultra medium partiti segmentis suborbicularibus; *petalis* 4 calycem facile superantibus oblongo-obovatis crassiusculis; *staminibus* permultis receptaculo convexo integro basi petalis adnato insertis antheris subsessilibus thecis 2 longitrorsum dehiscentibus præditis; *floribus* fem. ignotis.

Hab. Bellenden Ker, forest on long ridge; n. 6306.

Folia 11–14 × 4–5·5 cm., supra in sicco grisea, subtus griseo-viridia, horum glandulæ resiniferæ translucentes sparsæ; costæ laterales utrinque circa 100; petioli 10–12 mm. long., crassiusculi. Fasciculi pedunculus 4 mm. long. Calyx 7 mm. long.; hujus lobi 4 × 5·5 mm. Petala lactea dein brunnea, 12 mm. long., prope apicem 7 mm. lat. Andrœcium 8 mm. diam.; antheræ 1 mm. long.

Among Queensland species this is easily distinguished from *G. Warrenii* F. Muell., the only one at all resembling it, by the very numerous lateral nerves of the leaves.

Elæocarpus concinnus, sp. nov. (*Tiliaceæ*). Arbor; *ramulis* subteretibus sursum crebro foliosis fulvo-pubescentibus mox glabrescentibus novellis tomentosis; *foliis* subsessilibus ovatis vel ovato-oblongis acuminatis basi cordatis margine distanter ciliato-denticulatis papyraceis pag. sup. in costa centrali pubescentibus alibi sparsim puberulis vel fere glabris pag. inf. molliter sericeo-pubescentibus; *racemis* quam folia multo brevioribus subumbellatis paucifloris; *pedunculis* et pedicellis necnon bracteis parvulis dense pubescentibus; *sepalis* oblongis obtusis pubescentibus; *petalis* 5 sepala plane excedentibus oblongis (parte quaterna distali leviter amplificata) trifidis segmentis ipsis retusis vel etiam breviter bifidis extus glabris intus inferne pubescentibus; *staminibus* 13–15 antheris apice truncatis penicillatis; *ovario* glabro villoso 3-loculari; *stylo* stamina facile superante inferne pubescente superne glabro.

Hab. Kuranda, fringe of forest, 1000 ft.; n. 6332.

Folia solemniter 5–8 × 2·5–3 cm., supra in sicco viridia subtus pallida; costæ laterales utrinque 7–10, arcuato-ascendentes, ut costa centralis costulæque subtus mediocriter eminentes; rete sine lente vix aspectabile; petioli 2–3 mm. long., pubescentes. Racemi (floribus inclusis) circa 2·5 × 3–4 cm.; pedunculus 5–10 (raro 15) mm. long. Bracteæ 1·5–2 mm. long. Pedicelli filiformes, 3–5 mm. long. Flores chlorini. Sepala 1 cm. long. Petala 17 mm. long., basi 1·5 mm. juxta medium 2·5 mm., prope apicem 3·5 mm. lat., intus inferne carinata. Discus 1·5 mm. alt. Filamenta sursum microscopice puberula ceterum glabra, adusque 7·5 mm. long.; antheræ 2·25 mm. long. Ovarium 2 mm. diam. Stylus superne aliquanto gracilior, 14 mm. long.

Quite distinct from any Australian congener. The subsessile leaves cordate at the base and, apparently permanently, softly pubescent below serve to indicate this beautiful species at a glance.

Brombya platynema F. Muell. Kuranda, by creek in fringing wood, 1000 ft.; n. 6343. Flowers white. *Distrib.* North Queensland, hill ranges.

Brackenridgea australiana, F. Muell. Bellenden Ker, forest, 2000 ft.; n. 6322. Tree, calyx red, seeds blue-black. *Distrib.* North Queensland.

Acacia Cunninghamii Hook. Kuranda, common in forest and in open, 1000 ft.; n. 6330. *Distrib.* Queensland, N.S. Wales.

Eucalyptus pellita F. Muell. Kuranda, common in open and in forest, 1000 ft.; n. 6340. *Distrib.* East coast of Australia. Named by Mr. Maiden, to whom a specimen was submitted.

Rhodomyrtus trineura F. Muell. Kuranda, very common on fringe of forest, 1000 ft.; n. 6331. *Distrib.* North Queensland.

Decaspermum paniculatum Kurz. Kuranda, shady fringe of forest, 1000 ft.; n. 6333.

Eugenia (§ *Jambosa*) **rhadinantha** (*Myrtaceæ*), sp. nov. Arbor glabra; *ramulis* foliosis subteretibus cinereis; *foliis* brevipetiolatis oblongo-lanceolatis apicem versus gradatim angustatis apice obtusis basi obtusis paullove rotundatis coriaceis costis lateralibus supra visu difficilibus subtus sat perspicuis; *floribus* mediocribus in paniculas breves terminales axillaresve dispositis panicularum ramulis patentibus quaque apice plerumque 2–5 flores sessiles gerente; *calycis* tubo satis elongato a basi gradatim ampliato aliquantulum pruinoso segmentis late deltoideis obtusis persistentibus; *petalis* 4 inter se liberis quam calycis segmenta paullo majoribus suborbicularibus albis; *filamentis* liberis; *ovario* 2-loculari.

Hab. Kuranda, common in forest, 1000 ft.; n. 6350.

Folia opaca, plerumque 6–10 cm. long., 2·5–3·5 cm. lat., supra in sicco griseo-viridia subtus pallidiora; costæ laterales utrinque circa 12, patentes, usque ad costam longitudinalem a margine 2–3 mm. remotam sine ramificatione excurrentes; petioli validi, transversim rugati, 2–4 mm. long. Paniculæ 2–4 × 2·5–5 cm., harum ramuli filiformes, plerique 1–1·5 cm. long. Ovarium rugatum, 3 mm. cum calyce 7 mm. long. Calyx basi 2 mm. sub limbo 3 mm. lat.; hujus lobi 1–1·25 mm. long. Petala 1·5–2 mm. long. et lat. Filamenta 6 mm. long. Stylus superne angustatus, 7 mm. long.

From the description given, *E. macoorai* Bail. would seem to be near this, but *E. rhadinantha* has broader leaves, shorter calyces with smaller lobes, and shorter petals and filaments. In general appearance it much resembles *E. leptantha* Wight (or rather the Queensland plant referred, probably incorrectly, to that species by Bentham, Mueller and Bailey), a species which, apart from several floral differences, belongs to § *Syzygium*.

Eugenia (§ *Jambosa*) **erythrodoxa**, sp. nov. Arbor glabra; *ramulis* superne foliosis cortice cinereo cinctis; *foliis* ovato-oblongis prope apicem cuspidato-attenuatis apice ipso obtusis basi in petiolum satis longum cuneatim coarctatis tenuiter coriaceis costis lateralibus pluribus utrobique parum perspicuis; *floribus* mediocribus in racemum terminalem foliis multo breviorem pauciflorum digestis; *calycis* tubo obovoideo supra ovarium producto lobis inter se aliquantulum disparibus ovatis obtusis membranaceis decoloribus; *petalis* 4 obovatis obtusissimis margine paullo crenulatis rubris; *filamentis* elongatis liberis; *ovario* 2-loculari.

Hab. Bellenden Ker, in forest scrub on slopes; n. 6323.

Folia plerumque 7–10 × 3–3·5 cm., in sicco griseo-viridia, subtus parum pallidiora; costa media supra impressa subtus prominens; costæ laterales utrinque ultra 20, cum costa intramarginali a margine circa 1 mm. remota conjungentes; rete laxum etiam sub lente inconspicuum. Racemi usque ad 3 cm. long. Pedicelli patentes, dein decurvi, 5–15 mm. long. Calycis tubus (cum ovario) circa 7 mm. long., sub limbo 6 mm. lat.; lobi 6–8 × 5–6 mm., subcoriacei. Petala concava, 10 × 5 mm. Filamenta vivide rubra, summum 28 mm. long.; antheræ vix 1 mm. long. Stylus 3 cm. long.

Apart from certain minor differences this may be said to have the foliage of *E. Johnsoni* F. Muell. and the flowers of *E. Tierneyana* F. Muell.

Mackinlaya macrosciadea F. Muell. Bellenden Ker, common to summit, undergrowth in forest; n. 6324. Shrub, 3·5 m. high. Flowers green, fruit white. *Distrib.* Queensland.

Brassaia actinophylla Endl. Kuranda, common in forest; n. 6347. "Umbrella tree." Berries red. *Distrib.* Queensland.

Ophiorrhiza australiana Benth. Kuranda, undergrowth in forest; n. 6355. Herbaceous, 2–4 dm. high. Minute white flowers. *Distrib.* North Queensland.

Randia disperma, sp. nov. (*Rubiaceæ*). Frutex trimetralis; *ramulis* subteretibus striatis glabris; *foliis* (nonnunquam verticillatis) oblanceolatis prope apicem cuspidato-attenuatis apice acutis basi in petiolum brevem gradatim angustatis tenuiter coriaceis glabris; *floribus* majusculis in fasciculos pseudoterminales perpaucifloros sessiles dispositis; *pedicellis* plus minus patentibus filiformibus quam corolla brevioribus glabris; *ovario* calyce paullulum longiore oblongo-turbinato glabro; *calyce* truncato denticulato; *corollæ* tetrameræ glabræ tubo calycem multoties excedente omnimodo angusto lobis oblongo-obovatis apice breviter extenuatis margine erosis; *staminibus* corollæ ori affixis antheris sessilibus; *ovario* 2-loculari; *stylo* breviter exserto superne clavato; *stigmate* bidentato; *ovulis* quoque in loculo 2.

Hab. Bellenden Ker, on long ridge; undergrowth in forest; n. 6307.

Folia ±10 × 3 cm., supra subnitida subtus pallidiora opacaque, glandulis immersis translucentibus crebro prædita; costa centralis supra leviter impressa subtus eminens; costæ laterales etiam sub lente difficile aspectabiles. Pedicelli ± 2 cm. long. Flores albi, odorem suavissimum spirantes. Ovarium 4 mm., calyx 3 mm. long. Corollæ tubus 4·5 cm. long., deorsum 3 mm. sub limbo 3·5 mm. lat.; lobi vix 2 cm. long. Antheræ oblongæ, 2 mm. long. Stylus circa 5 cm. long., glabra.

A remarkable species and more like a *Gardenia*, but the perfect septa to the ovary bar it from that genus. The foliage, the flowers with narrow tube and fringed petals, and the ovary with but four ovules in all are the distinctive points.

Helichrysum rupicola DC. Kuranda, common in the open, in grass; n. 6354. *Distrib.* North Queensland.

Lobelia Benthamiana, sp. nov. (*Campanulaceæ*). Repens, foliis parvis plus minus late ovatis obtusis vel obtusiusculis sinuato-dentatis, pedunculis elongatis filiformibus.—*L. membranacea* Benth. Fl. Austral. iv. 129, non R. Br.

Hab. Kuranda, on shady banks by stream in forest, 1000 ft.; n. 6337.

This is the creeping *Lobelia* with small sinuate-toothed leaves collected by Dallachy at Rockingham Bay, by Mueller at Moreton Bay, Macgillivray (Port Curtis) and probably Robertson (Victoria); these Bentham referred to *L. membranacea* Br., which, as the type in the Natural History Museum shows, is a different plant with much larger leaves. The further description of *L. Benthamiana* will be found *loc. cit.* It may be mentioned that *L. humistrata* F. Muell., which Bentham, following Mueller himself, referred to *L. quadrangularis* Br., can hardly be conspecific with this, inasmuch as *L. quad-*

rangularis (of which there is a specimen neither at the Museum nor at Kew) is described as ascending, whereas the other is a repent species. *L. humistrata* F. Muell. seems therefore to be distinct, with affinity to *L. membranacea.*

The differences above alluded to may be shown as follows :—

Leaves prominently toothed	*L. humistrata* F. Muell.
Leaves orbicular, sinuate-toothed, mostly 1·5–2·5 × 1·5–2 cm.	*L. membranacea* Br.
Leaves broadly ovate, sinuate-toothed, mostly 8–10 × 5–6 mm.	*L. Benthamiana* nob.

Pratia Podenzanæ, sp. nov. (*Campanulaceæ*). Herbacea, repens; *caule* folioso hac atque illac radicante ancipiti puberulo; *foliis* subsessilibus suborbicularibus margine denticulatis fere glabris; *floribus* axillaribus pedunculis elongatis sursum pubescentibus insidentibus; *calycis* segmentis anguste lineari-lanceolatis acutis margine ciliolatis ovario æquilongis; *corolla* pro rata majuscula calycem facile superante lobis posticis lineari-spathulatis quam antici oblongo-obovati altius solutis; *antheris* omnibus barbatis; *ovario* ovoideo pubescente.

Hab. Queensland, Kuranda, abundant in open places; n. 6338: also Myola near Cairns; *Podenzana* in Herb. Mus. Brit.

Folia 11–15 × 9–11 mm., tenuiter membranacea, in sicco viridia, passim ciliolata, pag. inf. aliquantulum glauca; petioli 2–3 mm. long., puberuli. Pedunculi 4–5 cm. long., ancipites. Calycis segmenta 3·5 mm. long. Corolla violacea, 13 mm. long. Filamentorum columna 5 mm., antheræ 2·25 mm. long. Stigma subinclusum, 2-lobum.

Affinity with *P. pedunculata* Benth. and *P. puberula* Benth.; from the former differing in the large leaves, from the latter in the long peduncles, in the large flowers and bearded anthers from both.

Though there is no ripe fruit, appearances point to the species being baccate and thus referable to *Pratia.* It is unlike all the Australian Lobelias.

Leucopogon melaleucoides A. Cunn. Kuranda, "Rocky View," under trees in the open, 1500 ft.; n. 6341. *Distrib.* Queensland, N.S. Wales.

Dracophyllum Sayeri F. Muell. Bellenden Ker, just below and on summit in dense forest scrub, 4900–5400 ft.; n. 6317. Shrub up to 2 m. Bracts pink, flowers cream, fruit red. *Distrib.* Restricted to Bellenden Ker range.

Symplocos Thwaitesii F. Muell. Bellenden Ker, mountain slope, 2–4000 ft.; n. 6300. A tree with white flowers. *Distrib.* Queensland, N.S. Wales.

Melodinus gratus, sp. nov. (*Apocynaceæ*). Scandens; *ramis* foliosis puberulis dein glabris novellis pubescentibus; *foliis* ovato-lanceolatis sursum cuspidato-acuminatis apice ipso obtusis basi in petiolum brevem cuneatim angustatis chartaceis utrinque glabris; *inflorescentiis* in axillis solitariis sessilibus vel breviter pedunculatis

1–2-floris pedicellis patentibus post floritionem reflexis; *calyce* quam pedicellus plane breviore hujus segmentis late ovatis obtusis margine ciliolatis; *corollæ* tubo calycem plusquam duplo excedente basi orique aliquanto constricto lobis oblongo-lanceolatis acutis quam tubus longioribus; *staminibus* prope medium tubum insertis antheris superne angustatis apice acutis.

Hab. Kuranda, in forest, 1000 ft.; n. 6349.

Liane with very fragrant white flowers.

Folia plerumque 8–9 × 3–3·5 cm., opaca, in sicco griseo-viridia; costæ laterales utrinque ± 15, mediocriter perspicuæ; rete laxum difficilius aspectabile; petioli 5–6 mm. long. Inflorescentiæ pedunculus dum adsit 2–4 mm. long. Bracteæ subulatæ, circa 1·5 mm. long. Flores albi, suaveolentes. Calyx 3·5 mm. long. Corollæ tubus 8 mm. long., basi apiceque 2 mm., juxta medium 2·5 mm. lat.; lobi 10 mm. long. Antheræ 2 mm. long. Ovarium subglobosum, glabrum, 1 mm. diam. Stylus 1 mm. long.; stigma ·75 mm. long., appendicibus æquilongis præditum.

M. Guilfoylei F. Muell. has narrower leaves and smaller flowers with a shorter limb, and thus can be distinguished on sight.

Alyxia ruscifolia R. Br. Bellenden Ker, small forest to summit scrub, 3000–5000 ft.; n. 6302. Flowers white, berries orange. *Distrib.* Queensland, N.S. Wales.

A. ilicifolia F. Muell. Bellenden Ker, small forest to summit scrub, 3000–5000 ft.; n. 6299. Flowers white. *Distrib.* Queensland.

Lyonsia reticulata R. Br. Kuranda, fringe of forest, 1000 ft.; n. 6346. Liane with brown flowers. *Distrib.* Queensland, N.S. Wales.

Duboisia myoporoides R. Br. Kuranda, common in the open, 1000 ft.; n. 6335. Shrub to tree; flowers white. *Distrib.* Queensland, N.S. Wales.

Bœa hygroscopica F. Muell. Bellenden Ker, on rock overhanging the second creek, 1000 ft.; n. 6314. Flowers purple. This is also common on Barron Falls. *Distrib.* Queensland.

Eranthemum variabile R. Br. Kuranda (and lower slopes Bellenden Ker), common everywhere in forest and in open, 1000 ft.; n. 6339. Flowers white. *Distrib.* Queensland, N.S. Wales.

Clerodendron Traceyanum F. Muell. Kuranda, in the forest, 1000 ft.; n. 6334. *Distrib.* North Queensland.

The specimen has a more open inflorescence than usual, and the corolla-tube a little longer.

Peperomia leptostachya Hook. & Arn. Kuranda, on open rocks, 1200 ft.; n. 6342. *Distrib.* Queensland, N.S. Wales.

Cardwellia sublimis F. Muell.? Kuranda, common in forest; n. 6352. "Black Oak." The specimen, which is in fruit, seems referable here. *Distrib.* North Queensland.

Loranthus dictyophlebus F. Muell. Bellenden Ker, towards summit, in forest, 4500 ft.; n. 6318. Flowers from the stem, 3–9–10 in a bunch, reddish pink, tube yellow at apex. *Distrib.* Queensland, N.S. Wales.

Liparis reflexa Lindl. var. *cuneilabris* Ridl. Bellenden Ker, on moss-grown rock in small forest, 5400 ft.; n. 6305. Petals cream, labellum yellow. *Distrib.* (of var.) North Queensland.

Dendrobium Taylori Fitzg. Bellenden Ker, summit and just below on trees in dense scrub and small forest, 5000 ft.; n. 6303. Petals white, labellum yellow. *Distrib.* North Queensland.

Bulbophyllum Lilianæ Rendle, sp. n. (*Orchidaceæ*). Humilis, epiphytica; *rhizomate* elongato tenui ramoso tereti polyrhizo primo vaginulis mox fissis obtecto *pseudobulbis* laxe obsesso; *radicibus* subfiliformibus flexuosis glabris; *pseudobulbis* anguste cylindricis obliquis, in sicco valde rugosis, unifoliatis; folio super petiolum brevissimum reflexo, lineari-oblongo vel oblongo-elliptico, apice minute apiculato, crassiusculo, costa media superne canaliculata inferne prominente; *pedunculis* filiformibus, sub medio bractea tubuliforme vaginatis, unifloris; *flore* parvo bractea parva ovata acuminata suffulto, flavo-viride; *sepalis* dorso verruculosis, 3-nerviis; sep. dorsali lanceolato-oblongo, apice obtuso obscure apiculato, sep. lateralibus ovatis, basi anteriore paullo latioribus, apice ut in sep. dorsali; *petalis* lanceolatis, subobtusis, apice vix apiculatis, 3-nerviis; *labello* lateribus valde recurvatis convexo, apice obtuso, basi obscure auriculato, auriculis exceptis in sicco rubro-brunneo; *columnæ* alis latis obsolete dentatis; *ovario* et pedicello verruculoso.

Hab. Bellenden Ker, summit, small forest to dense scrub, alt. 5–5400 ft. In flower, March. No. 6304. Rhizoma circa 1 mm. diam. Pseudobulbi c. 1 cm. long. usque ad 5 mm. crass. Folia subsessilia ·8–2 cm. long., usque ad 7 mm. lat. Pedunculi c. 2 cm. long.; bractea florifera vix 2 mm. longa; pedicellus cum ovario 8 mm. long. Sepalum dorsale 6·3 mm. long.; 2·75 mm. lat.; sep. lateralia 6 mm. long.; 4·3 mm. lat. Petala 4·5 mm. long, 1·75–vix 2 mm. lat.; labellum 3·75 mm. long., c. 1·5 mm. lat. Columna 2 mm. long.

Evidently near *B. adenocarpum* Schlechter, which I know only from the description, and which it resembles in the convex labellum and warted ovary; it differs in foliage, the leaves of *B. adenocarpum* being linear and much longer, 3·5–4·5 cm.

Geodorum pictum Lindl. Kuranda, by road in the open; n. 6357. *Distrib.* Queensland, Northern Territory, New Guinea.

Eustrephus latifolius R. Br. Kuranda, "Rocky View," on rocks in open forest and in grass, 1200 ft.; n. 6337. *Distrib.* Queensland, N.S. Wales, Victoria.

E. angustifolius R. Br. Kuranda, in fields by railway line, 1000 ft.; n. 6338. *Distrib.* Queensland, N.S. Wales.

Tricoryne platyptera Reichb. f. Kuranda, in grassy fields along railway line, 1000 ft.; n. 6345. *Distrib.* Queensland.

Orania appendiculata Becc. MSS. (*Areca appendiculata* Bail., *Orania Baccarii* Bail.). Bellenden Ker, undergrowth in forest, 3000 ft.; n. 6316. *Distrib.* Bellenden Ker.

Calyptrocalyx australasicus Scheff. Bellenden Ker, small forest, isolated specimens from 5000 ft.; n. 6308. *Distrib.* North Queensland.

Bacularia Palmeriana Bail. Bellenden Ker, abundant from sea level to summit; n. 6315. Restricted to Bellenden Ker.

Freycinetia gonocarpa (*Pandanaceæ*), sp. nov. Scandens ramis ultimis fructiferis pendentibus laxe corticatis glabris; *foliis* ad normam generis parvis lineari-lanceolatis apice breviter acuminatis basi obtusis sub apice serrulato-denticulatis alibi integris vel fere integris glabris; *inflorescentiis* ♀ solummodo lectis 2–4-nis pedunculis sat crassis insidentibus; *syncarpio* quam pedunculus longiore oblongo hujus baccis succulentis haud confluentibus prominenter 5–6-gonis necnon costatis apice umbonatis, stigmatibus 2–3.

Hab. Kuranda, common in forest, March; n. 6348.

Folia 5–9 × 1–1·5 cm. Pedunculi 1·5–2 cm. long., 2 mm. diam. Syncarpium 2·5–3 cm. long., 1·5–1·8 cm. diam.; baccæ maturæ rubræ, 12 mm. long., 3 mm. lat., harum umbo 2 mm. alt. Semina paullulum curvata strophiolo raphique albo prominenter instructa, plerumque 1·5–2 mm. long.; testa rubra.

This differs from the Javan *F. Gaudichaudi* R. Br. in the small leaves, the ribbed more markedly angled berries with a prominent umbo and the somewhat larger seeds. Warburg (Pflanzenr., Pandanaceæ, 32) notes that Bailey (Syn. Queensl. Flora, 567) gives the Javan species as occurring in Queensland, remarking this to be probably in error for another and undescribed species. Curiously enough, he is unaware that not only Bentham (Flora Austral. vii. 151) but Mueller too (Syst. Census. Austral. Pl. 120) had previously claimed *F. Gaudichaudii* for Australia. Comparison of Australian material with the type (in the British Museum) of *F. Gaudichaudii* shows clearly enough the error into which Bentham, Mueller and Bailey have fallen.

Pothos longipes Schott. Bellenden Ker, abundant in forest up to 3000 ft.; n. 6298. Berries red. *Distrib.* Queensland, N.S. Wales.

Exocarya scleroides Benth. Bellenden Ker, general in small forest to summit scrub, 3000–5000 ft.; n. 6312. *Distrib.* Queensland. N.S. Wales.

Gahnia psittacorum Labill. Bellenden Ker, summit, on exposed ground, 5400 ft.; n. 6311. *Distrib.* Eastern Australia.

CRYPTOGAMS.

Hymenophyllum Baileyanum Domin. (*H. trichomanoides* F. M. Bailey, Rep. Govt. Sci. Exp. to Bellenden-Ker Range, p. 74, non Van den Bosch.) Bellenden Ker range, epiphytic on trees in forest and small forest, 2–5000′, March 1914; n. 6301. *Distrib.* North Queensland.

Alsophila Rebeccæ F. Muell. Bellenden Ker range, common on mountain up to the very summit, undergrowth in forest, 5400′, March 1914; n. 6313. Also in low-lying forest. Tree fern 2–3 m. high; slender stem. *Distrib.* North Queensland.

A. Robertsiana F. Muell. Bellenden Ker range; only one plant seen, in small forest, 5200′, March 1914; n. 6320. *Distrib.* North Queensland.

Blechnum Whelani F. M. Bailey. Bellenden Ker range, undergrowth in forest on long ridge, abundant, 3–4000′, March 1914; n. 6309. Terrestrial. *Distrib.* Confined to Bellenden Ker range.

Vittaria elongata Swartz. Kuranda, epiphytic in forest, pendant, 1000′, March 1914; n. 6344. *Distrib.* Queensland; New South Wales. Tropical Polynesia. Asia.

V. pusilla Blume var. *wooroonooran* Domin. (*V. wooroonooran* F. M. Bailey. Rep. Govt. Sci. Exped. to Bellenden Ker, p. 77, 1889.) Bellenden Ker range, epiphytic on trees and rocks in forest and summit scrub, 3000–5400′, March 1914; n. 6325. *Distrib.* The variety is confined to Queensland. The species extends from Queensland to Java, Malacca and Ceylon.

Polypodium simplicissimum F. Muell. Bellenden Ker range, epiphytic on trees and rocks, forest to summit scrub, 3000–5400′, March 1914; n. 6328. *Distrib.* Queensland.

P. Billardieri (Willd.) Christens. (*P. australe* Mett.). Bellenden Ker range, on trees and rocks, forest to summit scrub, 3000–5400′, March 1914; n. 6327. *Distrib.* Queensland; New South Wales; Victoria; Tasmania; New Zealand. Antarctic America. South Africa. New Guinea.

Cyclophorus acrostichoides (Forst.) Presl. Kuranda, epiphytic in forest, 1000′, March 1914; n. 6356. "Fronds very fleshy." *Distrib.* Queensland. Polynesia. Malay Islands. Ceylon.

Marattia fraxinea Sm. Bellenden Ker range, abundant from 2000′ to summit (5400′), undergrowth in forest, March 1914; n. 6321. "Plants about 1·25 m. high." *Distrib.* Queensland; New South Wales. Asia. Africa.

Clavaria aurantia Cooke & Massee in Grev. xvi. 33 (1887).

Terrestrial. Small forest undergrowth. Bellenden Ker, N. Queensland, 4500′, March; n. 6329.

Distrib. Australia.

The specimens differ from the original description in the fact that one of them was slightly branched. The spores cannot be described as small, being 5–7 $\mu \times$ 4–5 μ. They have a verrucose wall. The basidia are about 30 $\mu \times$ 7 μ, and have four stigmata 5–6 μ in length.

NEW RARE OR CRITICAL LICHENS.

By W. Watson, B.Sc.

(Concluded from p. 210.)

Gyrophora proboscidea form *fimbriata* (T. & B.) Mudd. On rock, 1600 ft., Llanberis (49). Apothecia were present.

Bæomyces rufus var. *sessilis* Nyl. Haddeo valley (5), Kingsettle hill (6).

Icmadophila æruginosa (Scop.) Trevis. The septate spores and the stichococcoid algal symbiont warrant the separation of this plant from *Bæomyces*.

Stereocaulon alpinum Laur. was found with apothecia on the

Killin hills in 1913. It is recorded from Ben Lawers in Crombie's Monograph.

S. condensatum Hoffm. is the only *Stereocaulon* as yet found in Somerset. It occurs at an altitude of less than 1350 ft. on an upright stone, Culbone hill (5).

Leprocaulon nanum (Ach.) Nyl. Near Kingston (5).

The Cladonias are a very difficult group, both in respect to determination and nomenclature. The intimate knowledge of these plants which Mr. T. Hebden, of Keighley, possesses has been very helpful to me, and I am indebted to him for many determinations of puzzling plants.

Cladonia foliacea (Huds.) Schaer. includes both *C. endiviæfolia* Fr. and *C. alcicornis* Flk. as varieties. Var. *convoluta* (Lam.) Wain. (=*C. endiviæfolia* Fr.). A plant so named by Dr. Parsons was obtained at Cleveden (6). The apothecia are almost sessile, so that it belongs to form *epiphylla* Schaer. Var. *alcicornis* (Light.) Schaer. is not uncommon in Somerset (5 & 6).

C. pyxidata var. *chlorophæa* f. *lepidophora* Flk. On old mossy wall, Cocker Combe (5).

C. pityrea (Flk.) Fr. Land's End (1), near Ashburton (3), Exmoor, Blackdowns and Quantocks (5), Shapwick and Standerwick (6), Llanberis (49). Form *crassiuscula* Wain. is fairly common on thatched roofs and tree-stumps in vice-counties 5 and 6. f. *hololepis* (Flk.) Wain. Land's End (1), Quantocks, Minehead and Treborough (5), near Frome (6), Murlough Glen (Ireland 38). f. *cladomorpha* Flk. Curland and Minehead (5), near Frome (6). f. *gracilior* (Nyl.) Harm., Hodder's Combe (5). f. *scyphifera* Wain. Exford (5), near Frome (6). f. *squamulifera* Wain. Treborough (5). f. *subacuta* Wain. Castle Neroche (5).

C. Lamarkii f. *Isignyi* (Del.) Nyl. There is little difference between this plant and *C. pityrea* f. *hololepis* unless there is a more constant yellow colouration with potash, and this reaction is an uncertain and inconstant one for the genus. On grassy heath, Treborough (5).

C. fimbriata (L.) Fr. A splendid specimen of the form *prolifera* (Retz.) was obtained under the shade of a bank on Blagdon hill (5). Var. *conista* (Ach.) Nyl. On stony banks, Horner, Exford and Kingston (5). Var. *tubæformis* (Hoffm.) Fr. is not uncommon in hilly districts. Var. *subcornuta* form *tortuosa* (Del.) Nyl. Castle Neroche (5); form *nemoxyna* (Ach.) Nyl., on dry rock, Horner (5). Var. *subulata* form *fibula* (Ach.) and var. *radiata* (Schreb.) Nyl. are not uncommon in Somerset (5 and 6). Var. *coniocræa* (Flk.). Quantock Combes and Haddeo valley (5). Var. *ochrochlora* (Flk.), Chard, Quantocks and Exmoor (5), Shapwick (6); forms *ceratodes*, *phyllostrota*, *truncata*, *monstrosa* and *actinota* have been found in Somerset. Wainio unites the two last varieties together as var. *apolepta* whilst Crombie (p. 142) places them as *C. ochrochlora*. Acharius' name of *apolepta* (1803) has priority over Floerke's name of *ochrochlora* (1828).

C. gracilis (L.) Hoffm Form *aspera* Flk., mossy rocks, Llanberis (49); form *abortiva* Schaer. Ben Eachan (88). Var. *elongata* f. *ecmocyna* Nyl. On rock, 1000 ft., Llanberis (49).

C. verticillata (Hoffm.) Flk. Simonsbath, 1300 ft. (5), Ben Eachan, 3100 ft., and Ben Lawers, 3900 ft. (88), Ben Doran, 2500 ft. (98). Var. *subcervicornis* Wain. is the common plant known in this country as *C. cervicornis* (Crombie, p. 144). Form *stipata* (Nyl.) is local but abundant on rocky subalpine or alpine ledges, Snowdonia (49), Killin hills (88), Ben Doran (98). Var. *cervicornis* (Ach.) Wain. (= *C. sobolifera* of Crombie, p. 144), Ashburton (3), Blagdon hill (5), Stourhead (6).

C. degenerans (Flk.) Spreng. Form *hypophylla* Nyl. near Harlech (48), Llanberis (49), Ben Doran (98). The type of *C. degenerans* (f. *euphorea* Ach.) is rare but var. *anomæa* (Ach.) Flk. is fairly frequent on upland heaths and moorlands. Cwm Bychan (48), Snowdonia (49), Castleton (57), Keighley (63). This variety is a scyphiferous form of var. *phyllophora* (Ehrh.) Flot.

C. strepsilis (Ach.) Wain. = *C. coralloidea* (Ach.) Mudd. Llanberis (49). Recorded from Ben Lawers (88) and found there in 1913.

C. furcata (Huds.) Schrad. Crombie, p. 150, states that the type of *C. furcata* is *Lichen subulatus* of Linnæus. This is a slip since the plant of Linnæus is *C. fimbriata* var. *subulata*. Hudson should be substituted for Linnæus in the text, as Hudson's plant is considered to be typical *C. furcata*. The type and varieties *corymbosa* and *spinosa* are common. Var. *rigidula* Mass. Buckden Pike (64), Ben Eachan at 3000 ft. (88). Var. *scabriuscula* (Del.) Coem. (*C. scabriuscula* Nyl.). Dittisham (3), Minehead and Blagdon Hill (5), Shapwick (6). Form *adspersa* (Flk.) = *C. adspersa* of Crombie p. 158. Exford (5), Shapwick (6). The subspecies *C. racemosa* Nyl. (*sec.* Crombie p. 151) is difficult to correlate with any single plant of Wainio. Dartmoor (3 & 4), Horner (5), Llanberis (49), Ben Lawers, 3900 ft. (88), Ben Doran (and f. *tenuior*, 98). Form *recurva* Flk. Horner (5), Ben Lawers (88). All these plants had squamulose podetia which Crombie gives as an important character of this subspecies. It is not *C. racemosa* Hoff. nor is it var. *racemosa* Flk., so that if it is retained as a subspecies, another name would have to be given to it. It seems to be unnecessary to retain it.

C. crispata (Ach.) Flot. Exmoor, Hadden Down and Blackdowns (5), Cwm Bychan (48), Llanberis (49), Nant-y-Ffrith (50 & 51), Skipwith (61). Var. *dilacerata* (Schaer.) Malbr. On mossy rocks, Cwm Bychan (48), Llanberis (49). Var. *cetrariæformis* (Del.) Wain. On peat, Haddon Down, 1000 ft. (5), Skipwith Common (61). Var. *gracilescens* (Rab.) Wain. On damp heath, Skipwith Common (61).

C. rangiformis Hoffm. = *C. pungens* (Ach.) Flk. Form *foliosa* Flk. On sand dunes, Kewstoke and Berrow (6).

C. squamosa Hoffm. Form *ventricosa* (Ach.) Fr. Achrioch (88). Var. *multibrachiata* f. *pityrea* (Arn.). On peat, Winsford hill (5). Var. *phyllocoma* Wain. On tree, Cloutsham (5). Var. *muricella* (Del.) Wain. Nant-y-Ffrith (51), Skipwith (61), Keighley (63), Ben Doran (98). *C. asperella* of Crombie, p. 150, refers to this plant and not to *C. squamosa* f. *asperella* Flk. which is scyphiferous.

C. symphycarpia (Ach.) Arn. Mr. Hebden considers that some plants referred to *C. cæspititia* really belong to this species. Raleigh's Cross (5), Bramble hill (11).

C. delicata (Ehrh.) Flk. On old stump, Orchard Portman (5).

C. coccifera (L.) Schaer. Form *cornucopioides* (Ach.) Fr. fil. (f. *phyllocoma* Flk.). Blackdowns, Exmoor and Quantocks (5), Masbury and Mendip (6), Llanberis (49), Greenfield and Keighley (63), Killin 88. Form. nov. *epiphylla* has the apothecia sessile or almost so on the thalline squamules. Greenfield (63). Var. *pleurota* (Flk.) Schaer. `Quantocks (5).

C. bellidiflora (Ach.) Schaer. Llanberis and Snowdon (49), Ben Laoigh 3600 ft. (88), Ben Doran (98).

C. digitata (L.) Hoffm. On decaying wood or on the ground. Combe Sydenham (5), Cannock Chase (39), Keighley (63). Many of the described forms such as *prolifera, phyllophora, denticulata* and *cephalotes* have been found.

C. macilenta Hoffm. Var. *scabrosa* (Mudd.) Nyl. Quantocks and Treborough (5), Frome (6), Keighley (63), Kircubbin (Ireland 38). Var. *styracella* (Ach.) Wain. Blackdown and Brendon hills (5); form *clavata* (Ach.) Fr. Blagdon hill (5). Var. *ostreata* Nyl. Keighley (63).

C. flabelliformis (Flk.) Wain. What is usually known in this country as *C. macilenta* v. *coronata* may be taken as the type of this segregate. The chief differences between it and *C. macilenta* are that *C. flabelliformis* has larger thalline squamules, the podetia are granulose, scyphiferous and more or less radiate, whilst *C. macilenta* has farinose and ascyphiferous podetia. Form *polydactyla* (Flk.) Wain. is not uncommon in Somerset. Excellent examples occur on a somewhat shaded bank on Staple hill (5). Form *phyllophora* (Mudd.). On bank, Holford Combe (5). Form *ventricosa* (Huds.) Cromb. Haddeo valley (5). Form *luxurians* Harm. A plant agreeing with this occurs on a heath on the Quantocks (5). The reaction with potash is indefinite and the form is variously referred to *C. macilenta* (*flabelliformis*), *C. bacillaris* and *C. hypocrita* Wain.

C. bacillaris (Ach.) Nyl. Staple hill (5), Crompton moor (59), Greenfield and Keighley (63). Var. *subcoronata* Nyl. Staple hill (5).

C. Floerkeana (Schaer.) Fr. A spadiceous form occurs on Selworthy hill. Var. *intermedia* Hepp. Blagdon hill, Brendon hill and Triscombe (5). Var. *carcata* Wain. Blackdown and Brendon hills (5); the form *trachypoda* Nyl. is common on peaty moorlands.

Cladina sylvatica (Hoffm.) Nyl. Form *lacerata* (Del.) Nyl. is practically the same thing as f. *fissa* (Schaer.). Exmoor and Blackdowns (5), Black Down (6). Form *grandis* (Flk.). Exmoor, Blackdowns and Quantocks (5), Black Down (6), Nant-y-Ffrith (51), Killin (88). Form *tenuis* Lamy. Cleeve hill and Shipham (6), Keighley (63). This form, together with *C. rangiferina* f. *tenuis* Flk., has been elevated to specific rank as *C. tenuis* by Harmand.

C. impexa Harm. is separated from *C. sylvatica* because its ultimate branches are spreading and not recurved to the same side. Frequent on the Somerset hills (5 & 6), Harlech (48), Beddgelert (49), Delamere (58), Skipwith (61). Form *portentosa* (Duf.) Harm. Elworthy (5), Risbury (8). Form *pumila* (Ach.) Harm. Blagdon hill (5), Cannock Chase (39), Skipwith (61), Greenfield and Keighley (63). This form is better placed under *C. impexa* than under *C. alpestris* which is softer and rather more intricately branched. A scabrid state is frequent, and is probably due to age. On the Pennines between Oldham and Penistone the podetia are often almost black. This blackening, which is shown by other vegetation, is chiefly due to the smoke from the neighbouring industrial district.

C. uncialis form *adunca* (Ach.) Leight. Exmoor and Blackdowns (5), Snowdon (49), Skipwith (61), mountains near Killin and Tyndrum (88), Ben Doran (98); form *turgescens* (Del.) Cromb. Snowdon (49), Killin hills (88), Ben Doran (98); form *obtusata* (Ach.) Nyl. On moist rocks, Cwm Glas (49), Killin hills (88), form *integerrima* Wain. Keighley (63); form *dicræa* (Ach.). Nant-y-Ffrith (51), Kircubbin (Ireland 38 from T. Glover).

Thamnolia vermicularis (Sw.) Schaer. On ground, 3200 ft., Snowdon (49).

Lecanactis abietina (Ach.) Krb. Broomfield (5), New Forest (11), Mulgrave wood (62). The spermogoniiferous condition (*Sphæria leucocephala* Pers.) has large spermatia, $12–16 \times 3–4\ \mu$, and is more frequently found than the apothecial state. Another spermogoniiferous condition found on bark at Kingston (5) has smaller spermatia, $3–4 \times 0{\cdot}7–1\ \mu$. The spermogonia are similar to those of *L. abietina*, the algal cells are in yellowish chains, sometimes with orange-red granules and it may be one of the Pyrenotheæ described by Leighton in his Angiocarpous Lichens.

Arthonia lurida var. *spadicea* (Leight.) Nyl. On old oak, Broomfield (5).

A. radiata var. *Swartziana* f. *simulans* (Leight.). Near Taunton (5).

A. subvarians Nyl. is parasitic on the thallus of *Lecanora galactina* and is probably a fungus. Staple Fitzpaine (5).

Opegrapha atra var. *arthonoidea* Leight. Thurlbear (5).

O. calcarea form *heteromorpha* (Stiz.) A. L. Sm. On slaty rocks, Morte Point (4).

O. vulgata var. *siderella* (Ach.) Nyl. Cothelstone hills and Stoke St. Mary (5).

O. varia form *tridens* Ach. Staple hill (5), near Frome (6).

Graphis elegans (Borr.) Ach. Form *parallela* (Schaer.) Leight. On birch and beech, Quantocks, Blackdowns and Exmoor (5), Kingsettle hill (6). Form *stellata* Leight. On holly and oak, Quantocks (5), Longleat (6), near Bettwys-y-Coed (49). Form *coacervata* Leight. On holly, Quantock hills (5).

G. scripta form *stellata* Leight. Red Lynch (6).

Phæographis inusta (Ach.) Muell-Arg. Horner wood (5).

Graphina Ruiziana (Fée.) Muell-Arg. On birch near Treborough (5).

Verrucaria mucosa Wahl. Quantoxhead (5).

V. aquatilis Mudd. On stones in upland streams, near Crowcombe (5), Shipham (6).

V. hydrela Ach. Exmoor (5).

V. lævata Ach. Near Taunton (5).

V. margacea Wahl. Treborough (5).

V. æthiobola Wahl. Malsmead (4), Exmoor, Aisholt, and Treborough (5), Y Garn, 2500 ft. (49).

V. submersa Schaer. Not uncommon in the Quantock Combes (5), Llanberis (49).

V. cœrulea DC. Near Taunton (5), Cheddar and Ebbor Gorge (6).

V. glaucina Ach. usually occurs on calcareous rocks but it may extend on enclosed flints. Winsham (5).

V. fuscella (Turn.) Ach. On top of calcareous wall near Taunton (5).

V. maculiformis Kremp. is not uncommon on slaty rocks, Exmoor, Quantocks and near Washford (5), Dinorwic (49).

V. rupestris var. *subalbicans* (Leight.) Mudd. On mortar, Staplegrove (5).

V. integra (Nyl.) Carroll. On calcareous walls near Taunton (5 *teste* A. L. Sm.), Bruton (6). A form found on earth derived from the decomposition of calcareous rock has a somewhat greenish thallus and the perithecial pits are deeper. This may be distinguished as form *terrestris*. Merridge near Bridgwater and Stoke St. Mary (5).

V. calciseda DC. Orchard Portman (5), Mendip (6).

Thelidium immersum (Leight.) Mudd. Babbacombe (3), Brean Down (6), Bwlch Gwyn (50), Castleton (57).

Polyblastia intercedens Loenn. On limestone wall, Buckden (64).

P. inumbrata (Nyl.) A. L. Sm. Llanberis (49), Creag-an-Lochan (88).

P. theleodes (Somm.) Th. Fr. Buckden (64), Creag-an-Lochan (88).

P. tristicula (Nyl.) Th. Fr. On mosses of wall, 100 ft., Taunton. The only previous British record was by Adm. Jones in 1864.

Staurothele ebborensis, sp. nov. Thallus crustaceus, albidocinerascens, gonidiis viridibus (Protococcus). Perithecia parva, nigra, minute papillosa, innata vel leviter emerso-convexa, integra; ostiolo depresso; hymenii gonidiis subspheroidiis viridibus; ascis clavatis uni- vel bi-sporis; paraphysibus hyalinis evanescentibus; osteoli filamentis multis; gelatina hymenia cœrulea iodo; sporis oblongis, hyalinis vel leviter brunneis, primum unitriseptatis demum inordinate muraliformibus, 0·028–45 mm. longis, 0·014–19 mm. latis.

Thallus crustaceous, greyish-white, algal cells (Protococcus) green. Perithecia small, dark, minutely papillate, innate or slightly convex and emergent, entire; ostiole depressed; hymenium with green subspheroidal algal cells; asci clavate 1- or 2-spored; paraphyses hyaline, disappearing; osteolar filaments many; hymenial gelatine blue with iodine; spores oblong, hyaline or slightly brown, at first 1–3-septate, then irregularly muriform, 28–45 × 14–19 μ. On Carboniferous limestone, Ebbor Gorge, Mendip, Somerset (6), April 1917. Small dark dots are often sprinkled on the thallus, the hymenial algal cells have thin cell-walls and are arranged in irregular and broken lines between the asci, those near the ostiole sometimes having a reddish tinge. The spores do not give any particular stain with iodine, are usually uncoloured but may be slightly yellowish or brownish, are often single in the ascus, and the cells occasionally become fairly regular.

The relationship of this plant with *S. umbrimum* and *S. clopima* is very close. The chief difference is in the colour of the spores, and this is a variable character for the genus, as well as for other genera of Verrucariaceæ. It is with some hesitation that I give it the status of a species, since a careful revision of the genus may result in the union of some of the species already described, and the Ebbor Gorge plant may have to be considered as a variety or form.

Arthopyrenia areniseda A. L. Sm. Similar incrustations to those found on the Southport sand-dunes have been observed on Braunton burrows (4) but no apothecia have as yet been detected.

Leptorhaphis epidermidis (Ach.) Th. Fr. is a fungus. Chard (5).

Didymosphæria pulposi Zopf is a fungus parasitic on the thallus of *Collema pulposum.* The spores are usually 4-næ, 1-septate, colourless, 19–23 × 6–7 μ, and the asci are untinged with Iodine. Corfe and Wrantage (5). A specimen of a similar parasite on *Leptogium scotinum*, collected by Mr. Hebden at Buckden (64) has smaller spores, 12–16 × 3·5–4 μ, which are usually 8-næ and the asci become reddish with iodine. On a specimen of *Collema granuliferum* collected in rock crevices near Yatton (6), another parasite occurs. The minute perithecia are brownish above, the paraphyses are indistinct or absent, the ascus is longly-clavate, 50 × 12–13 μ, the hymenial gelatine becomes bluish with iodine, quickly changing to wine-red. The spores are colourless, one-septate, 26 μ long, and are of a peculiar shape, their lower cells being acuminate and much longer and narrower than the upper ones which are 6–7 μ broad.

In conclusion I must acknowledge my indebtedness to Miss A. L. Smith and Messrs. Hebden, Reader and Wheldon, who have been kind enough to examine plants submitted to them, and to supply me with much information respecting them.

NOTES FROM CARNARVON AND ANGLESEY.

By C. E. Salmon, F.L.S., and W. G. Travis.

Most of the following plants were noted by C. E. S. during a hurried two days' visit to Carnarvonshire in June, 1916, with a day's excursion to Anglesey; and by W. G. T. during two visits to the latter in June and September of the same year. The only portions of Anglesey visited on these occasions were the neighbourhood of Holyhead and the adjacent rocky coast of Holy Island, and, on the larger island, some of the dune tracts on the south-west coast, namely, Rhosneigr, Aberffraw, Maelog, and Newborough. It has been thought convenient to combine and publish in the form of a joint paper our individual notes and records (which were made quite independently of each other), together with the conclusions reached by us in correspondence concerning some of our gatherings.

With but few exceptions, we have omitted any reference to species well known from the localities in question and duly recorded in Griffith's *Flora of Anglesey and Carnarvonshire* (1895). Generally speaking, we have only included in this paper such plants as are either not recorded in that work, or for which few stations are given. Supposed new county records are indicated by a *.

All the Carnarvonshire localities fall in District II of Griffith's *Flora*, and a few have been included that were noted by Mr. A. J. Crosfield in 1902 (distinguished by the initials A. J. C.), and by C. E. S. in 1891, as well as some records that have come to hand from time to time.

We are indebted to Messrs. E. G. Baker, C. Bucknall, G. C. Druce, J. W. White, and others, for help in determining critical gatherings.

CARNARVON (v. c. 49).

Ranunculus Lenormandi F. Schultz. Near Beddgelert, plentiful. 1891. Above Bethesda on way to Ogwen. *T.*

Chelidonium majus L. Pont y Cyfyng. A. J. C.

Arabis hirsuta Scop. Near Meillionen, Beddgelert.

Cochlearia micacea E. S. Marsh. A specimen which unfortunately was not in fruit, gathered in 1891 near the summit of Snowdon, was submitted to the Rev. E. S. Marshall who reported—"This is probably my *C. micacea* of which it has quite the habit. That and *Cerastium arcticum* occur together on Ben Lawers, and *C. arcticum* is a Snowdon plant."

Polygala oxyptera Reichb. Near Meillionen Farm, near Beddgelert.

Sagina subulata Presl. Near Meillionen. Apparently rare in the county, or perhaps overlooked. Only two stations given in Griffith's *Flora.*

Spergula sativa Boenn. Pont y Cyfyng. A. J. C.

Hypericum dubium Leers. An example in Hb. Cambridge from Llanberis! 1832, C. C. Babington, comes under the usual British form var. *erosum* Schinz; Dr. E. J. Salisbury has shown me a specimen he gathered in a wood near Bettws-y-Coed in 1913 which goes under forma *perforatum* of *erosum* (=*H. maculatum* Cr. subsp. *erosum* Fröhlich f. *perforatum* Tourlet).

Lathyrus montanus Bernh. var. *tenuifolius* Druce. Pont y Cyfyng. A. J. C.

Geum rivale L. Near Ogo Owen. Griffith says "Rather rare."

Alchemilla alpestris Schmidt. Llanfairfechan! 1886 (Hb. Mrs. Makovski). Near Ogo Owen, near Beddgelert.

A. minor Huds. Cwm Idwal! 1876. A. Ley. (Hb. Mus. Brit.)

Saxifraga platypetala Smith (teste E. S. Marshall). Cwm Glas Bach. 1891.

Parnassia palustris L. Pont y Cyfyng. A. J. C.

Sedum roseum Scop. Near Ogo Owen.

**Galium sylvestre* Poll. Near Meillionen, Beddgelert.

Crepis paludosa Moench. Pont y Cyfyng. A. J. C.

Hieracium Sommerfeltii Lindeb. (teste E. F. Linton). Moel Siabod! A. J. C.

H. cambricum F. J. Hanb. (teste Lintons). Limestone rocks, Pabo Hill! 1900. C. Waterfall.

H. angustatum Lindeb. (teste E. F. L.). Cwm Idwal! A. J. C.

**H. cacuminatum* Dahlst. (teste A. Ley). By Ceunant Mawr Waterfall, Llanberis. 1891.

H. diaphanoides Lindeb. (teste W. R. L.). Cwm Glas Bach. 1891.

H. sparsifolium Lindeb. (teste E. F. L.). Moel Siabod! A. J. C.

Taraxacum spectabile Dahlst. Near Twll Du. Var. **maculiferum* Dahlst. Near Ogo Owen.

Vaccinium Vitis-Idæa L. Near Meillionen, Beddgelert.

Veronica hybrida L. There is an example of this in the Herbarium of the Holmesdale N. H. Club, Reigate, labelled—Cwm Idwell, Rev. H. Kirby" †, but it has never been confirmed, I believe, from this part of Carnarvonshire since Evans (in Turner & Dillwyn, Bot. Guide, i. 78, 1805) recorded it from—"Hyssva Bengam and Trygyvylchi Rocks near the Glyder"—Griffith, in his *Flora*, does not admit this record.

Euphrasia scottica Wettst. (teste Townsend). Pont y Cyfyng. A. J. C.

**E. minima* Jacq. var. *nana* Rouy. Near Meillionen, Beddgelert. See Journ. Bot. 1917, Supp. i. p. 28. Named by Mr. C. Bucknall.

Melampyrum pratense L. var. *hians* Druce. Pont y Cyfyng! A. J. C.

**Mentha longifolia* Huds. Marshy land, Capel Curig! 1916. A. Wallis.

Chenopodium Bonus-Henricus L. Pont y Cyfyng. A. J. C.

[*Cypripedium Calceolus* L. "I have tried to establish it both by seed sowing and planting the roots in a secluded rocky wood near Bangor, and so far the attempt has been attended with good results." A. D. Webster, Brit. Orchids, p. 93, 1886.]

Eriophorum vaginatum L. Cwm Glas and near Beddgelert. 1891.

Carex pilulifera L. var. **longibracteata* Lange. Near Meillionen, Beddgelert.

C. pallescens L. Pont y Cyfyng. A. J. C. Near Meillionen Farm.

C. fulva Host. Near Llyn Padarn.

Hymenophyllum unilaterale Bory and *Asplenium viride* Huds. Near Meillionen, Beddgelert.

Polystichum lobatum Presl forma **lonchitidoides* Hooker, Brit. Fl. ed. 3, 449, 1835 (as a var.). Near Ogo Owen. This is evidently only a young state of *lobatum* but it deserves mention as it is sometimes reported as the true *P. Lonchitis*. It was apparently first noted in Wales in 1696 (Ray, Synop. ed. 2, 48) as follows—"4. Filix

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† No date is given, but the specimen was gathered probably about the "thirties."

Lonchitidi affinis. Hoc titulo plantam ad me misit D. Lhwyd præcedenti [*lobatum*] similem, pinnulis tamen rotundioribus & longioribus aculeis obsitis in montosis Cambro-Britannicis collectam." In the 3rd edition (121, 1724) Dillenius adds the apt remark—"Priori [*lobatum*] eadem, nec nisi junior planta videtur."

Some authors place this "variety" under *P. aculeatum*, e. g. Smith, Fl. Brit. 1122, 1804, Eng. Fl. iv. 290, 1828, Deakin, Flor. Brit. iv. 91, 1857, etc., whilst it is the *A. aculeatum* var. *cambricum* Gray, Arr. ii. 7, 1821.

Lycopodium Selago L. var. **patens* Desv. Near Ogo Owen, near Beddgelert. Agrees with the description of this variety rather than that of *recurvum* Desv. The spreading leaves give the plant a peculiar look, recalling *annotinum*, which is even more pronounced than the Welsh plant in an example I possess, ex herb. J. E. Winterbottom, labelled—*L. Selago* var., Widdy Bank Scar, Teesdale, Durham, 31 Aug. 1838.

Anglesey (v. c. 52).

Fumaria Bastardii Bor. (fide H. W. Pugsley). Between Ty Croes and Llyn Maelog. *S.*

Barbarea præcox Br. Between Ty Croes and Llyn Maelog. *S.*

Cakile maritima Scop. Sandhills, Tre-Arddur Bay. *T.*

Viola Curtisii Forst. var. *Forsteri* H. C. Wats. Common on the sandhills at Penrhos, Holyhead; Borth Wen, Rhoscolyn; Rhosneigr; Newborough; and Tywyn Aberffraw; in the last locality as a small form. *T.* Sandy ground near Llyn Maelog. *S.* Most of our gatherings differ somewhat from the usual Braunton Burrows plant in having larger flowers and a longer spur. *T.*

**V. Pesneaui* Lloyd. Common on the dunes, Newborough Warren. *T.*

**V. agrestis* Jord. In a vegetable garden, Pentre Canol, Holyhead. *T.*

**V. segetalis* Jord. Near Soldiers Point, Holyhead. *T.*

**V. derelicta* Jord. Sparingly on an open roadside bank near Porth Dafarch, in association with *Ornithopus perpusillus* and *Aira præcox*; grassy ground in a garden, Pentre Canol, Holyhead Mountain. *T.*

Polygala serpyllacea Weihe var. **vincoides* Chodat. Heathy ground on the cliffs near South Stack. *T.*

Sagina ciliata Fr. Between Ty Croes and Llyn Maelog. Agrees with the description of *patula* Jord. in Corbière's *Flore de Normandie*. *S.*

S. subulata Presl. By roadside through heathy common at Porth Dafarch. *T.*

Montia chondrosperma Fenzl. Near Llyn Maelog. *S.*

Radiola linoides Roth. Very abundant on a bare moorland near Porth Ruffydd, Holy Island. *T.*

Hypericum humifusum L. var. *decumbens* Reichb. (determ. by H. W. Pugsley). Between Ty Croes and Llyn Maelog. *S.*

Geranium lucidum L. Between Ty Croes and Llyn Maelog. *S.*

Anthyllis Vulneraria L. var. *coccinea* L. Grassy banks on the cliff tops near Porth y Garan. *T.* Griffith reports it from "all along the S.W. coast of Anglesey, from Aberffraw to Holyhead."

**Anthyllis maritima* Schweigg. Grassy banks, cliffs near South Stack. *T.* Most of the examples gathered are typical as regards hair-clothing and agree well with Schweigger's original description (in Hagen, *Chlor. Boruss.* 265, 1819) as to this feature—"pilis in caule petiolisque densis, adpressis." Growing however with these plants were others provided with an abundance of conspicuous *spreading* pubescence on stems, petioles and margins of the leaves and involucres giving the examples a very distinct appearance. Corbière (Fl. Norm. 148, 1894) noticed this variation, remarking "poils ord. apprimés, mais parfois très étalés surtout dans le bas des tiges," and refers to "var. *sericea* Bréb." for this form. If we turn, however, to Brébisson (Fl. Norm. ed. 3, 83, 1859) we find simply—"*A. Vulneraria* L. var. *sericea.* Tiges dressées; fol. larges, couvertes de poils soyeux, surtout en dessous †," which does not bear out Corbière's reference; moreover, in ed. 5, 1879 Brébisson gives var. *maritima* Koch (equalling *maritima* Schweigg.) as a synonym of his *sericea.* Thus the plant with the spreading hairs is left without a distinguishing name and we propose to call it *A. maritima* Schweigg. var. *Corbierei.*—Caules folia petiolique valde patento-villosæ.

Sedum Telephium L. On sea cliffs in a cove at Clybyddead near Porth Dafarch. *T.*

Smyrnium Olusatrum L. Holy Island, 1891. *S.*

Daucus gummifer Lamk. var. **intermedius* Corb. On cliff tops between South Stack and Porth Dafarch. *T.* The plants from this locality seem to match, except in their being more hispid, the Dorset form mentioned in this Journal for 1911, p. 364. As regards the ultimate shape of the fruiting head in these Anglesey plants, various intermediate stages were particularly noted between the convex or flattish umbel and the typical concave one of *Carota.* That accurate observer of Anglesey plants, the Rev. Hugh Davies (*Welsh Botanology,* 1813), evidently had this same plant under his notice when he wrote (p. 27)—"*D. maritimus*; Sea-coast Carrot; The plants (for there were several of them), which I suppose to be this species, grew in that same bay, Porth Dafarch, in the clefts of very steep rocks, but out of my reach; so that I could not examine them as minutely as I wished to have done. They bore, however, that distinctive character of an Umbel in seed, perfectly flat, if not somewhat convex, and larger than I had ever before observed."

The *D. maritimus* of Withering (Arr. Brit. Pl. ed. 3, ii. 290, 1796), of which he gives a plate (t. xxxii.) in the 7th edition, ii (1830), and calls the "Cornish Coast Carrot" (p. 369), is the basis upon which Rouy and Camus (Fl. Fr. vii. p. 239, 1901) established their *D. gummifer* var. *Witheringianus.* The only characters by which they separate it from type are the broader more elongated divisions of the involucre which exceed the umbel, as indicated in Withering's drawing. This, however, is taken from a young example with the flowers barely expanded and it is doubtful if this involucral feature would be anything like so noticeable in mature plants with fruiting umbels, but it is a point to be observed by coast botanists. An example well matching Withering's plate was distributed through the Watson Botanical Exchange Club a few years ago collected by Mr. J. W. White in 1912 at Bedruthan Steps, Cornwall, but this, too, was only in young flower.

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† Corrected to "dessus" in ed. 4, 88, 1869, and ed. 5, 107, 1879.

Scabiosa Succisa L. var. **subacaulis* Bernardin. On close grassy turf on the cliff tops near South Stack, Holyhead. *T.* This small form, 1–3 inches high, which is perhaps the same as Mr. West's Shetland plant (Journ. Bot. 1912, p. 266), seems to agree with Rouy's description (Fl. Fr. viii, p. 115, 1903) of Bernardin's *subacaulis.* This Anglesey "dwarf" is no doubt on a par with other condensed forms of exposed cliffs (e. g. *Campanula glomerata* var. *nana* C. Bailey) which are now generally recognized as "states" only.

Filago minima Fr. Sand-dunes, Newborough. *T.*

**Matricaria suaveolens* Buch. Roadsides and waste places in many spots about Holyhead. *T.*

Senecio vulgaris L. var. **radiatus* Koch. Sandhills at Newborough. *T.*

Senecio spathulæfolius DC. This was seen in its well known stations near Holyhead, and was in fine condition in the third week in June. So far as our observations go, which are at variance with Griffith's remark (*op. cit.* p. xiii), "The presence of . . . . *Senecio spathulæfolius* in a few localities of this district does not seem to have any direct relation to the nature of the soil," it seems restricted to soil derived from glacial drift, which is present in many of the coves and hollows on the seaward faces of Holyhead Mountain, as well as on the tops of the cliffs at many places. Its favourite habitat is on sunny slopes and banks above the sea in slightly sheltered positions and among its associates are *Anthyllis maritima*, *Scilla verna*, *Jasione montana* var. *maritima* and *Armeria maritima.*

Comparing Anglesey *S. spathulæfolius* with examples from Westmoreland † the former possesses leaves of a decidedly more fleshy or "leathery" texture and those at the base seem larger, broader and sometimes nearly orbicular in outline (Journ. Bot. t. 226, f. 5, 1882). This coast plant is not happily matched with any Continental *spathulæfolius* we have seen and Mr. Backhouse's original view, that his Westmoreland plant and the Welsh one both differed from this species, may prove to be correct. Hooker and Syme also held this opinion. The specimens from Westmoreland, as cultivated, approach closer to the plant of the Continent.

Jasione montana L. var. **maritima* Duby. Rocky coast near South Stack. June 1916. We consider that plants collected here should be placed under Duby's variety (in De Candolle, Bot. Gall. ed. 2, i. 311, 1828) with the description of which it has much in common. Duby was evidently struck with the remarkable divergence of the coast form from the inland type, for he adds, after the description—"An distincta sp.?" Its chief distinguishing features are its biennial or perennial root, its general hairiness, its stout simple or little-branched stem, 10–18 cm. high, which is hairy up to the head of flowers and the broad ± obtuse hairy exterior involucral scales, hairy calyx and large heads of flowers. Its nearest ally seems var. *major* Koch, but that is a plant of mountain regions, with stems glabrous in the upper part, glabrous calyx and the involucral scales longer and more acute and glabrous beneath; it is also a much taller plant ("caules 2 pedales") with longer and less fleshy leaves.

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† Garden-grown material: we believe specimens have never been found in this county during their flowering period. See Journ. Bot. 1914, 138.

It seems doubtful whether our plant is the same as the Spanish var. *maritima* described by Willk. & Lange (Prod. Fl. Hisp. ii. 283, 1870) as the diagnosis there would seem to indicate an even more hirsute plant, with woolly involucral scales, pedicels and calyx-teeth, as one might expect in a more southern climate.

The variety *maritima* will probably not prove infrequent upon our coasts, chiefly on the south and west; an example in Hb. C. E. S., labelled *J. montana* L. var. *major* M. & K., collected by Mr. W. T. Blackwood at Howth, Ireland, in June 1910, and distributed by Mr. McTaggart Cowan, junr., agrees well with the Anglesey plant.

Calluna vulgaris Hull. var. *incana* Reichb. Common, growing with type, on the moorland near Porth Ruffydd. *T.*

Anagallis arvensis L. var. *carnea* (Schrank). Sandy ground near Llyn Maelog. *S.* Abundant on dry dunes all over the Newborough Warren. *T.* We consider this species a true native in these localities, and note that the Rev. H. J. Riddelsdell has satisfied himself (Journ. Bot. 1911, p. 90) it is so on limestone in Glamorganshire. We must bear in mind, however, that we have no data as to the time of origin of the Newborough dunes; they may only have been formed within comparatively modern times and are banked up on old coastal cliffs, from cultivated ground on which the plant may possibly have originally spread to the dunes. On the Lancashire coast, however, this plant certainly shows no tendency to spread from the cultivated margin of the dune tract into the sandhills and it is absent from the dunes proper.

Hyoscyamus niger L. Sandy ground near a farm, Newborough Warren. *T.*

Veronica Anagallis-aquatica L. var. **montioides* (Boiss.). Damp hollows in the dunes, Newborough Warren. *T.*

Plantago Coronopus L. A short, very hairy form from near Holyhead is said by E. G. Baker and Miss Cardew to approach var. *brevifolia* DC.

Plantago maritima L. var. **linearis* Davey (non Syme). In bosses on bare turfy ground, on cliff tops, Holyhead Mountain; cliff tops, South Stack. *T.* Determined by Miss Cardew and E. G. Baker.

Atriplex laciniata L. Sandy coast near Llyn Maelog. *S.* Sandhills, Tre-Arddur Bay. *T.*

Rumex crispus L. var. **trigranulatus* Syme. Very common on the coast of Holy Island. *T.*

Euphorbia Paralias L. Abundant on sandy coast near Llyn Maelog. *S.*

Helleborine viridiflora Wheldon & Travis. Newborough Warren. See Journ. Bot. 1916, p. 247. *T.*

Orchis maculata L. var. **præcox* Webster. Common on heather moorland, Holyhead Mountain. *T.*

**O. prætermissa* Druce. Marshy ground at head of Llyn Coron. Put under this by Mr. Druce, who suggests the plant requires further investigation. *T.*

O. incarnata L. Near Llyn Maelog. *S.*

Scirpus filiformis Savi var. *pygmæus* (Kunth). Moist bank in a cove near South Stack. *T.*

Carex pulicaris L. Near Llyn Maelog. *S.*

**C. Pairæi* F. Schultz. Between Ty Croes and Llyn Maelog. *S.*

C. distans L. With *C. vulpina* on moist banks in a cove near South Stack. *T.*

Kœleria albescens DC. var. **glabra* DC. Close turf on the cliff tops near South Stack. Mr. Druce reports—"The *Kœleria* is similar to plants named for me by Domin as *albescens* var. *glabra* DC. which equals *arenaria*."

Desmazeria loliacea Nyman. Holy Island. 1891. *S.* Sparingly on rocks in the dunes at Newborough. *T.*

Bromus molliformis Lloyd. Dry banks by the sea in a cove near South Stack. *T.* This is the plant referred to in *Bot. Ex. Club Report*, 1916, p. 596, where the specimens were distributed under the name var. *compactus* (Bréb.) and which Mr. Druce called var. *conglomeratus* (Pers.).

After further examination, it is now considered that these Anglesey specimens should be named *molliformis* (=*Lloydianus* Godr. et Gren.), and they match satisfactorily Cornish and Channel Island examples similarly labelled.

It is interesting to note that Rouy (Fl. Fr.), Lloyd (Fl. de l'Ouest Fr.), Richter (Pl. Europ.), Ascherson & Graebner (Fl. Mittel-Europ.), Grenier & Godron (Fl. Fr.), Boreau (Fl. Centre Fr.), Coste (Fl. Fr.), etc., give the plant specific rather than varietal rank, and we have adopted this view. In Hayward's Bot. Pocket-book, ed. 13, p. 249, 1909, it is described as being prostrate; the Anglesey plants agree with the original description and are erect.

NITELLA MUCRONATA IN GLOUCESTERSHIRE.

By James Groves, F.L.S., and Rev. G. R. Bullock-Webster.

In May last Miss Roper sent us fresh specimens of an extremely interesting *Nitella* discovered by her near Wickwar, West Gloucestershire (v. c. 34). It resembled in appearance a very slender state of *N. mucronata*, but the ultimate rays of the branchlets, which usually afford a distinguishing character in the genus, were more like those of *N. gracilis* than *N. mucronata* in that the penultimate cell tapered slightly and was terminated by a comparatively large conical ultimate cell, instead of having the more or less rounded end with the minute and narrow apical cell presenting the mucro-like appearance which characterizes *N. mucronata* and gives rise to its name. Moreover, three-celled ultimate rays were frequent as in *N. gracilis*, while in the British specimens of *N. mucronata* they are comparatively rare. The fruit also was smaller than in normal *N. mucronata.* We were inclined at first to think that it might be a large form of *N. gracilis*, especially as there were traces in some of the specimens of an earlier more slender growth. Later specimens with ripe fruit, however, decided the question, the membrane of the oospore proving to possess the peculiar form of reticulate decoration which belongs to *N. mucronata* and not the very close and fine granulated markings of *N. gracilis. N. mucronata* var. *flabellata* Coss. & Germ. (var. *tenuior* Braun), though more slender than the type, with smaller fruit, has the characteristic ultimate rays of *N. mucronata* though in a less marked degree, as shown both in the plate in Alt. Flor. Par. (t. 40. f. 4–5) and in specimens issued under the name *tenuior* by Braun and Nordstedt. The Wickwar plant is much more extreme than either of these and we therefore think it desirable to differentiate it as:—

N. MUCRONATA var. GRACILLIMA (var. nov.).

Caulis ramulique insolenter graciles. Radius ultimus sæpe tricellulatus. Cellula penultima ad apicem gradatim fastigata, itaque apex quam basis cellulæ ultimæ non multo latior est. Cellula ultima elongata conica. Oospora matura c. 290 μ longa, 275 μ lata.

Miss Roper has furnished us with the following particulars as regards the habitat, etc.:—

"I first noticed the plant on April 30, 1917, growing in a small pond nearly six feet deep of clear land water, situated due east of Rangeworthy, W. Glos. In this district there are many similar ponds of varying depths from which the mineral strontia has been dug at various times within the last 50 years, and many rare plants grow about there as survivals of the old heathland. The *Nitella* was very abundant in the pond, and the only growth, and so far has not been detected in any of the others. *N. opaca*, however, is not far away in two localities." She has kept the plant under observation and has kindly sent us specimens from time to time, so that we have been exceptionally fortunate in having the opportunity of examining it in different stages of growth. The discovery of *N. mucronata* in Gloucestershire represents an important extension of the known range of the species, which was hitherto only recorded in England from Hants, N. Sussex, W. Oxon, Norfolk, W. Cambs, Beds, and in Ireland from Co. Monaghan.

SHORT NOTES.

LEPIDIUM CAMPESTRE var. LONGISTYLUM A. G. More ined. Recently while looking through A. G. More's interleaved copy of Bromfield's *Flora Vectensis*, kindly lent me by its owner Mr. H. J. Jeffery, I came across the following MS. note in More's handwriting under *Lepidium campestre*:—"β. *longistylum.* Style twice as long as the notch, stems usually numerous. Its numerous stems and long style render it likely to be mistaken for *Smithii*, but its silicules are very scaly. Only a luxuriant biennial state. No doubt this is what Bromfield mistook for *Smithii* and described as occurring in old clover-fields, in clover not ploughed up in the autumn but left until the following June: found by me in Armagh." The last part of the sentence refers no doubt to More's Irish specimens mentioned by Mr. Salmon in this Journal for 1911 (p. 163), which Dr. Thellung refers to *L. campestre.* Under *L. Smithii* More has this further note:—"There is a var. of *L. campestre* which I call '*longistylum,*' likely enough to be mistaken for *L. Smithii.* Its style is much exserted but the capsule is scaly at back, and was probably the Ryde plant." The *Lepidium* found by Mr. H. N. Dixon and myself on a railway embankment at Kingsthorpe, Northants, in 1905 (see B. E. C. Rep. 1905, p. 541, and W. B. E. C. Rep. 1905, p. 41), must be very near this; it agrees as regards the style-character, but the pods are only slightly scaly. A plant collected by Mr. Druce in the same locality (see B. E. C. Rep. 1910, p. 541) does not seem to be quite the same as mine; it has slightly longer styles and has been put under *L. heterophyllum* by Dr. Thellung, the monographer of the genus, while More's Armagh plant he refers to *L. campestre.* The occurrence of these doubtful forms suggests that intermediates between *L. campestris* and *L. heterophyllum* sometimes occur, as all the characters mentioned in the books as distinguishing the two species are variable.—A. BRUCE JACKSON.

SURREY HELLEBORINES. Last year I was shown by Mr. A. Beadell, of Warlingham, a locality in his district where Helleborines were especially fine and abundant. At the time these plants appeared to be *H. latifolia*, but later study suggested the possibility of *H. atro-viridis* being represented there. Mr. John Cryer, who has made a special study of the genus, was also of this opinion, and fresh examples from the same locality, gathered this year, have demonstrated the existence of this species in the county. *H. atro-viridis* has also been found during the past season at Oxshott and on the North Downs near Leatherhead. I have a typical example from the downs near Horsley, gathered so long ago as 1899. This form is probably frequent in Surrey, but restricted *H. latifolia* I believe to be by no means common, though I have it from Chelsham and West Horsley. *H. media* is found at various places on the North Downs as at Clelsham, Mickleham, and near Leatherhead. It appears to be a species not very well understood, as botanists of repute have, in the past, given me this name for forms of *H. purpurata.* This latter form is quite frequent on the deposits overlying the chalk, though it seldom occurs in profusion. The most interesting member of the genus encountered in Surrey hitherto is *H. atro-rubens*, which was found in a wood on the North Downs near Leatherhead. This is a rather notable extension of its range, as I am not acquainted with any previous record of its occurrence in the south of England. I am indebted to Mr. Cryer for valuable assistance rendered in the examination of my plants, as well as for the loan of dried specimens, microscope slides, and other material elucidating these highly critical species.—C. E. BRITTON.

MIDDLESEX PLANTS. *Cuscuta europæa*, indicated in Trimen and Dyer's *Flora* as probably extinct in the county, grows in various localities at Shepperton, on *Urtica dioica*, *Humulus*, *Arrhenatherum*, *Prunus spinosa*, etc. It is noteworthy that no *Cuscuta* is mentioned by Mr. Druce in his notes on Middlesex Flora in this Journal for 1910, pp. 269–278. *Caucalis nodosa* var. *pedunculare*, above Penton Hook. *Campanula glomerata*, very luxuriant and plentiful in alluvial meadows, Shepperton. The "fine trees" near Sunbury mentioned in Fl. Middlesex (p. 251) under the name of *Populus alba* are not this species, but *P. canescens*. *Juncus compressus*, near Laleham. *Festuca pratensis* var. *pseudo-loliacea*, Thames side opposite Surbiton. *Equisetum arvense* var. *nemorosum*, near Laleham. The following hybrid plants have been seen in the Shepperton district: *Rubus cæsius* × *idæus*, a large patch covering a space of ground about 36 feet by 9 feet; *Carduus crispus* × *nutans*, associated with parent species, *Symphytum peregrinum* × *officinale* var. *ochroleucum*; flowers fleshy-lilac in colour, stems slightly winged—presumably Mr. Bucknall's × *S. discolor*—associated with the cultivated and the pale-flowered forms.—C. E. BRITTON.

REVIEW.

Morphology of Gymnosperms. By JOHN M. COULTER and CHARLES J. CHAMBERLAIN. Revised edition. 8vo. Pp. xi, 466, tt. 462. University of Chicago Press, 1917. Price $5.00 net.

IT is interesting to compare the thin volume, entitled Morphology Spermatophytes, issued by Professors Coulter and Chamberlain in 1901, with the stout volume now under consideration. The earlier volume formed Part i. of a larger work and dealt with the Gymnosperms, the Angiosperms being treated in a separate part issued in 1903.

In 1910 the part dealing with Gymnosperms was rewritten and published under the title Morphology of Gymnosperms. The 179 pages of text and 106 figures of the book of 1901 grew in 1910 to 430 pages of text and 462 figures. In the intervening years the groups of plants had been subjected to an extensive critical examination, and a number of special investigations had been carried out in their own laboratory by the authors and by workers who had studied under them. The presentation in the later work was, so far as concerned the living groups, from an entirely different standpoint and, to quote the preface of 1910, was "based upon our own work, supplemented by the work of other investigators, rather than a compilation from literature supplemented by occasional personal observations." The intervening period was also one of great activity in the work of investigation of the Gymnosperms—the number of titles in the bibliography increased from 112 in 1901 to 420 in 1910. The authors closed the preface to the work of 1910 with the remark that a book of this nature is in a certain sense out of date as soon as it has left the press, as papers will continue to appear which would have been of great service in its production.

The period of activity in the work on Gymnosperms, both recent and fossil, did not come to an end in 1910; this is matter of common knowledge to botanists who take any interest in the morphology and phylogeny of the group and its bearing on the wider question of the phylogeny of the seed-plants. The fact is also emphasized by the eight pages of additional bibliography which form an appendix in the recently issued edition of 1917.

It is therefore with a feeling of disappointment that we realize that these eight pages of additional bibliography comprising 150 titles constitute the most important difference between the editions of 1910 and 1917.

In a brief prefatory note the authors explain that the volume is in no sense rewritten. Certain corrections and additions have been made, but only such as would not break the continuity of the pages. Reference is made to the chapter on Cycadales as that in which the most numerous changes will be found, as this group has received the most attention since the publication of the former edition. But a comparison of the two editions shows that these changes have been but few; the number of cases in which fertilization has been described has increased (p. 148) from three to five, and the account of the development of the proembryo on pages 152 and 154 has been revised. Otherwise there seems little alteration. The more recent work on *Welwitschia* and *Gnetum* is left unnoticed in the text, as the chapter on Gnetales appears to be practically unaltered.

We do not belittle the invaluable work which Professors Coulter and Chamberlain have done in their presentation of the Morphology of the Gymnosperms, and heartily endorse Professor Jeffrey's dictum which appears on the paper cover of the book: "The most important general work on the Gymnosperms which has ever appeared." It is important that new generations of students should be able to acquire a work of classic importance, but botanists who already possess the edition of 1910 will hardly find it worth while to obtain that of 1917. We are hoping for many things after the War, and among them we would include a really new edition of the *Morphology of Gymnosperms.*

A. B. R.

BOOK-NOTES, NEWS, ETC.

Mr. H. A. Wager, Professor of Botany at the Transvaal University College, Pretoria, has published *A Check List of the Mosses of S. Africa,* in which are brought together all the known mosses of that region. The list contains 160 genera and 846 species in 37 families. A number of new species are indicated, of which descriptions will shortly be published. The list is issued by the Transvaal Museum.

THE Annual Report for 1916 of the Yorkshire Philosophical Society contains the conclusion of the interesting Catalogue of British Plants in the Society's Herbarium (the publication of which was begun in the Report for 1894) by Mr. H. J. Wilkinson, the Hon. Curator. The Catalogue contains the locality, collector, and date of the specimens, with a reference to the herbaria from which they were derived. The most interesting are those of James Dalton (1764–1843) and Samuel Hailstone (1768–1851), the former of which was presented to the Society by Dalton in 1827.

MR. D. A. JONES publishes in the *Lancashire and Cheshire Naturalist* for August a list of the Mosses and Hepatics of South-west Anglesey, and in the *Naturalist* for September and October a similar list for Denbighshire.

MR. R. LL. PRAEGER publishes in the *Irish Naturalist* for September a paper on the occurrence of *Equisetum litorale* in Ireland.

THE two parts (issued together in September) of vol. xlii. of the *Journal of the Royal Horticultural Society* contain two papers of much botanical as well as horticultural interest—Mr. E. A. Bunyard's on the history and development of the Red Currant and Mr. C. H. Payne's on the Dahlia and its reported introduction in 1789. Mr. R. Farrer's Report from Kansu and Tibet is also full of interest: the names published in the report must not escape the notice of botanists. Mr. F. J. Hanbury gives an account, with illustrations from photographs, of his rock-garden at East Grinstead: the Rev. Joseph Jacob writes on "Daffodil Developments" and Prof. M. C. Potter on "Economic Mycology."

IN the recent part (vol. lxi. part 2) of the *Memoirs of the Manchester Literary and Philosophical Society* Mr. Charles Bailey gives a detailed description of the fine herbarium presented by him to the Victoria University of that city, of which some account was given in our May issue (p. 141).

THE *Kew Bulletin* issued in August (no. 3, 1917) contains a revision of *Aspidopterys* by Mr. J. Hutchinson, in which twenty-two species are enumerated and three new ones described . . . a continuation of his papers on Nigerian Fungi by Mr. E. M. Wakefield (with three new species and an interesting note on *Monilia carbonaria*) and of Mr. Hutchinson's notes on African *Compositæ*, in which *Matricaria* and *Chrysanthemum* are dealt with, including a new species of the latter. In view of a possible renewal of the recent attack upon the existence of the *Bulletin*, it might we think be well to give more prominence to matters economic, which in this issue are represented only by two pages devoted to "seed selection in the cultivation of *Hevea brasiliensis*."

THE GENUS OPHRYS.

By Colonel M. J. Godfery, F.L.S.

This genus is placed by Ascherson and Graebner in their *Synopsis der Mitteleuropäischen Flora*, vol. iii. (1905–07), in the tribe *Ophrydeæ*, sub-tribe *Serapiadinæ*, which comprises the genera *Ophrys*, *Orchis*, *Serapias*, *Aceras*, *Himantoglossum*, and *Anacamptis*.

Of these, *Ophrys*, *Orchis*, and *Serapias* are well defined and natural genera; the last three, though generally recognised, are not quite so distinct, and it is not altogether certain that the characters on which they rest are of sufficient value to entitle them to generic rank. *Ophrys* is a particularly natural and well-defined genus: there is never any difficulty in identifying an *Ophrys* as such, or doubt as to whether any given specimen of European ground-orchid belongs to this genus.

Ascherson and Graebner divide the genus into the following sections:—

A. Lip *usually* only slightly convex, flat or almost flat at the edges.
  I. Lip slightly convex, edges tolerably flat, three-lobed, without bosses or appendix. Lateral inner divisions of the perianth tongue-shaped, the outer light green. Beak of column very short obtuse .... *Musciferæ.*
  II. Lip slightly, only *exceptionally strongly convex*, edges flat, broadly obovate from a broad base, short, velvety, with a glabrous appendix directed forwards. Outer divisions of perianth pale rose or white; inner lateral divisions usually almost three-cornered and light purple. Beak of column short, pointing forwards .... *Fucifloræ.*
B. Lip *usually* very strongly convex, with strongly reflexed edges.
  I. Lip as a rule undivided, with or without a very short appendix .... *Araneiferæ.*
  II. Lip usually with a large appendix. Outer divisions of perianth violet-rose or white .... *Apiferæ.*

This division into sections is not altogether satisfactory. It is largely founded on the degree of convexity of the labellum. This sometimes varies considerably in different individuals of the same species, and is not a fixed quantity: in any case, it is a difference of degree and not of kind, and one which involves no structural or functional characters. No clear line of demarcation is drawn between the sections. The group A II, "Lip slightly convex," includes some forms in which this is "strongly convex," and the use of the word "usually" in the main definitions of A and B is a tacit admission that these groups are not always easily separable by the characters given.

This division into sections is somewhat indefinite and inconclusive.

It is suggested that a more natural division into sections, founded on constant morphological and functional characters, would be as follows:—

A. *Eusepalæ.*

Outer divisions of perianth sepaloid, *i. e.* firm and rather rigid in texture, green in colour, protective in function.

B. *Pseudo-petalæ.*

Outer divisions of perianth petaloid, *i. e.* thin and translucent in texture, brightly coloured or white, and having as their object the attraction of insects for the fertilization of the flower.

Perhaps the reason why some such arrangement has not been adopted long ago is that it is so obvious. There is a not unnatural tendency to regard the obvious as superficial, and to look for deeper characters. Probably it was assumed that the differences in the sepals* of the two sections were only a question of colour, and therefore of no account: hence their inward meaning and importance were overlooked, or not fully appreciated. I hope to show that they are deep, and go to the root of the matter.

The difference between the two sections is first of all a morphological one, analogous to that which exists between a typical calyx and a typical corolla. Take, for instance, the calyx and corolla of *Rosa canina.* Both no doubt are modified leaves, but they have been modified in different directions, and have become differentiated to such a degree as to be structurally distinct. So it is also in the case of the two sections of *Ophrys.* The sepals in the first section have retained their original form. They are true sepals, comparatively thick and firm in texture, more or less rigid and semi-opaque, rich in chlorophyll, and so to speak built for strength and resistance to weather. In the Pseudo-petalæ, on the other hand, they have been carried to a more advanced stage of development. A higher note has been struck: a still higher purpose is in view. So we find them fine and thin in texture as the petal of a rose; translucent, so that the sunlight shining through them may light up the brilliance of their colour; with no chlorophyll except on the midrib or nerves which strengthen their delicate expanse. The dull green of the sepal has given place to the colours of a corolla. They are clearly designed for beauty and attractiveness, rather than for protective purposes, and have been raised to the dignity of a higher plane in the evolution of the flower.

Secondly, the difference between the two sections is a functional one. The main object of the sepals is to protect the young and tender corolla from injury before expansion. This is well seen in the poppies, in which the calyx is deciduous, and falls off as soon as this service is accomplished. Similarly their function in the Eu-sepalæ is to envelop the unexpanded bud in a protective covering impervious to weather, and later on to give shelter from rain or excessive sunshine to the essential parts of the flower, the anther and the stigma. For this reason the upper sepal arches over the column, and the lateral ones form a sort of screen on each side. Every detail suggests protection as the ultimate object in view.

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* The term sepal will be used hereafter instead of the conventional "outer divisions of the perianth" for the sake of brevity and clearness.

The function of the sepals in the Pseudo-petalæ is quite different. It is to attract the insects necessary for the fertilization of the flower. They are signals of invitation to the desired guests—easily seen and alluring. Hence they are spread as wide as possible to display their beauty to the fullest extent, the upper one erect, the side ones at right angles to the axis of the flower. Hence too their colour, ranging from pure white through various shades of rose and pink to deep magenta, and it must be admitted that they make a most effective show, far surpassing in this respect the Eu-sepalæ, which have to depend on the lip alone to announce their presence.

A possible objection may be raised on the ground that this arrangement separates *O. apifera* from *O. bombyliflora*, and that these are allied by the shape of the labellum and the turning up of the appendix behind it, to such an extent that they are included by Barla and also by Ascherson and Graebner in their section Apiferæ. It must however be remembered that many authors, following Reichenbach's example, consider *bombyliflora* so unique as to form the representative of a separate section. In spite of the resemblance referred to above, *bombyliflora* comes much nearer to *aranifera* than to *apifera*. Not only does it differ from the latter in the essential particulars of the form and function of its sepals, but also in many other details. Of all European species of *Ophrys* it has the most dull and inconspicuous flowers, very like *aranifera* in general effect but smaller and still less striking in appearance, whilst *apifera* is showy and attractive. It further resembles *aranifera* rather than *apifera* in habit, in the shape and disposition of its leaves, the colour of the lip, and its division into only three lobes (whereas *apifera* has five) and in the very short obtuse beak of the column, in marked contrast to the very long curved beak of *apifera*. In the presence of one or more tubers in addition to those at the base of the stem, and their growth at the apex of a long fleshy rootlet, it stands alone amongst European species of *Ophrys*.

A further objection may be raised that *O. aranifera*, though belonging to the Eu-sepalæ, is also found with petaloid sepals, as shown in plates 54, 55, of Barla's *Iconographie*. But the plants there figured are not *O. aranifera* at all. Those with coloured sepals on plate 54 are *O. arachnitiformis*, which had not been differentiated from *O. aranifera* in Barla's time, but which with further research is becoming more and more recognised as a constant and effective species, whilst plate 55 consists of hybrids. I have seen very many specimens of *aranifera* in England, France, Switzerland, Italy, Sicily, and Malta, but I have never seen one with coloured sepals. So far from showing a tendency to vary in this direction, *aranifera*, in its hybrids with species of the section Pseudo-petalæ, not infrequently exerts so strong an influence that it overcomes the heritage of petaloid sepals in the second parent, and the offspring reverts to the green sepals of *aranifera*. So-called *aranifera* with coloured sepals will be found on investigation to be either *arachnitiformis* or a hybrid.

There is, further, another point of difference between the Eu-sepalæ and Pseudo-petalæ. All the latter have an appendix at the apex of the lip, and in several species, e.g., *arachnites*, *scolopax* and *tenthredinifera*, it is large and rather conspicuous. In the former there is no appendix, except in the case of *O. bombyliflora*, which has a rather thick triangular one, turned up, like *apifera*, at the back of the lip. This is the only instance of a really developed appendix in that section. Rarely *aranifera* has a very short rudimentary appendix, but it is at least doubtful whether this is not due to hybrid influence.

It is difficult to see why an appendix should always be found in conjunction with petaloid sepals, but such is the case. It is still more difficult to understand why it should occur in *bombyliflora*. The use of this organ to the plant is not easy to explain. It attains its greatest development in those species with the largest and most conspicuous flowers. It is usually stiff and rigid, and turned up in front of the lip. Possibly it serves to stiffen the lip, to prevent it from bending under the weight of an insect, and to give a more solid foot-hold to visitors. This, however, does not explain its presence in *apifera* and *bombyliflora*, in which it is turned up at the back of the labellum, where its use appears somewhat doubtful and obscure.

It will I think be admitted that the above arrangement divides the genus *Ophrys* into two eminently natural sections, easily distinguishable without reservations or exceptions, and with definite and clear morphological and functional points of difference.

The two sections indicated above may be conveniently divided into the following sub-sections:—

A. EU-SEPALÆ.

I. *Convexilabellæ.*

Lip very convex, edges strongly revolute, appendix nil (except in *O. bombyliflora*) or (very rarely) rudimentary.

O. aranifera, *atrata*, *litigiosa*, *Tomassinii*, *bombyliflora.*

II. *Planilabellæ.*

Lip nearly flat, only slightly convex, appendix nil.

O. fusca, *lutea*, *pallida*, *speculum*, *muscifera.*

B. PSEUDO-PETALÆ.

I. *Retroversæ.*

All lobes of lip revolute. Appendix turned up behind the labellum.

O. apifera.

II. *Porrectæ.*

Side lobes only of labellum revolute. Appendix turned up in front of labellum.

O. arachnites, *scolopax*, *cornuta*, *tenthredinifera*, *Bertolonii.*

III. *Rudimentariæ.*

Appendix short, rudimentary.

O. exaltata, *arachnitiformis.*

JUNCUS GERARDI IN LINCOLNSHIRE.

By the Rev. E. A. Woodruffe-Peacock, F.L.S.

This may be a species, but personally I consider it only a variety of *J. compressus*. It arrived in this parish, Cadney-cum-Howsham, North Lincolnshire. about 1900, on the western rise just below Howsham day-school. There were only a few scattered plants at first—three or four: they were not in the least cæspitose then. As it was most certainly a new arrival I determined to watch it very closely. Missing out dates generally, these notes are the practical results of my observations.

The plant spread down the south side of this road on the damp Chalky Boulder Clay for some twenty yards in more or less solid cæspitose masses. About 1906 it crossed the road to the much drier grass-edge of the raised foot-path on the north side. From this position apparently it began spreading rapidly, for the north side of this road is the one used. In 1912 I detected it in a furrow by the roadside through a meadow 2¼ miles to the west in Cadney. Two years later it was in the furrow on both sides of this road; in the same year by the foot-path grass side in the village of Cadney, and later below a natural spring pond in a pasture 350 yards to the north. At first it was not cæspitose in any of these spots.

Now as all these localities have been analysed annually to pick up any indications that they might give regarding means of transport, there can be no doubt that this species was detected as soon as it was in evidence.

The following is what I judge to be the history of this species in this parish. Till this world-war stopped it, the school children here visited the sea-side every July, spending a day at Cleethorpes. There, at the junction of the Humber Estuary with the sea, this *Juncus* grows. In warm dry seasons like those between 1893 and 1900 this species has ripe seed between the 15th and 25th of July. Its seeds will not float in water, but when damp, like those of other *Junci*, have a slight mucosity sufficient to make them stick to boots. In this way, I believe, it was originally carried from Cleethorpes shore to just below Howsham School. It has been spread by the same means to the spots in Cadney, or by the feet of cattle perhaps in the last-named locality.

This is not all. *Juncus* seeds, as a rule, soon sink in flowing water, unless by their mucosity they can attach themselves to drift of some kind. My friend Dr. H. H. Corbett, of Doncaster, tells me that the following estuarine species are on the warpings at present being made on Thorne Waste, by the Great Central Railway, about six miles south of the River Ouse, from which the warping drain brings the water surcharged with estuarine alluvium. The seeds of *Aster Tripolium* sink at once in water, but it is practically found on all warpings. The seeds of *Atriplex deltoidea* will float for six months; it too is practically always found under the same conditions. *Scirpus maritimus* seeds will float from one to four weeks, and it is generally found on warpings. *Juncus Gerardi* is also usually found there. Now the *Atriplex* and *Scirpus* seeds may easily have reached this distant inland warping by flotation alone, but not so the *Aster* and *Juncus*. These must surely have come in the same way as the *Juncus* reached and has spread in this parish—by carriage, while sticking by their mucosity or chance to drift of some kind. Only yesterday (Aug. 8) after I had been walking through very long wet grass, I sat talking to a friend for two hours: when I rose to go I found two seeds of *Taraxacum vulgare* still sticking to my trench boots, along with a young *Helix rufescens*: *Taraxacum* shows no more mucosity than *Aster* does. It is curious that these four estuarine species have only been recorded for our warpings during the last hundred years; it is equally curious that *Camelina sativa*, which also sticks from its mucosity, has been reported from some warpings also at various times.

HYBRID ORCHIDS.

The recently issued Report of the Winchester College Natural History Society for 1915–17 is largely concerned with hybrid Orchids, in which the neighbourhood of Winchester appears singularly rich. The observations recorded by the Rev. S. A. McDonald and three of his pupils have been communicated to Dr. Keller, of Aarau, who proposes to embody them in his forthcoming work on Orchids. During the last two years there have been observed: "A new form of *Habernaria viridis* × *Gymnadenia conopsea* (*Gymplatanthera Jacksonii*), *Orchis Fuchsii* × *H. viridis* (two types), *O. Fuchsii* × *O. prætermissa*, *O. prætermissa* × *O. incarnata*, *O. prætermissa* × *O. latifolia*, *O. ericetorum* (=*maculata* L.) × *O. incarnata*, *O. ericetorum* × *prætermissa*." Of each of these a detailed description is given, accompanied by plates from drawings and photographs: the hybrids figured are *O. prætermissa* × *O. Fuchsii*, *O. Fuchsii* × *H. viridis* (three forms), and *O. incarnata* × *O. maculata*.

Mr. McDowall writes: "The examination of some hundreds of these plants inclines me more and more strongly to the belief that *O. latifolia* and *O. Fuchsii* (= *O. maculata*) represent a single dimorphic species, of which the down-forms have become fairly stable, while the marsh-forms show every kind of intermediate. Neither label, colour, shape of leaf, type of spotting (rings, or simple spots, or blotches), hollowness or solidity of stems, affords any definite guide in these last. While the typical marsh form of *latifolia* is perfectly distinct from the typical marsh form of *maculata* (*Fuchsii*), these typical forms being the commonest, nevertheless every possible intermediate, every conceivable combination of characters, exists. On the other hand, *prætermissa* seems to be a constant and definite species, at any rate in this district, though it is very ready to hybridize with the other marsh-forms." *O. ericetorum* and *O. incarnata* are well-marked and definite species; both however are inclined to hybridize with other forms, which may have helped to cause confusion.

O. latifolia and *O. maculata*=*Fuchsii*—the names in the paper are sometimes rather puzzlingly employed—are regarded "as a dimorphic species on the way to establish two races—a process almost accomplished in the down forms. The two last are easily distinguished in their typical forms. Both have lined labels (*prætermissa* is spotted), but in *maculata* the label is deeply cleft, with a long narrow mid-lobe, in *latifolia* it is more or less bracket-shaped, the mid-lobe being, however, more pronounced than this description implies. *Maculata* tends to a solid stem, *latifolia* to a hollow; *maculata* tends to spotted leaves, *latifolia* to ringed; the leaves of the latter are wider, blunter, and more fleshy. The colour of the flower in *latifolia* is generally a deepish purple; in *maculata* the ground is lighter, so that the lines are more marked." Mr. McKechnie in a separate paper suggests two theories—or, rather, says that they "suggest themselves"—"first, that *O. latifolia* is originally a hybrid between *O. Fuchsii* and *O. prætermissa*; second, that *O. latifolia* was originally the marsh form of *O. Fuchsii*." The latter, however, he considers the more probable, thus practically agreeing with Mr. McDowall, who, as we have seen, regarded the two as forming one dimorphic species.

The paper is so interesting that we regret it should not have been published in a medium more readily consulted than is the Report of a school society.

MENTHA EXIGUA L.

By James Britten, F.L.S.

Since writing a notice of this as "An Overlooked British Mint" (Journ. Bot. 1916, 224–6) I have come across a paper by Smith (in Trans. Linn. Soc. iii. 18–22) on "The Botanical History of *Mentha exigua*" in which he claims to have elucidated the history of the plant and which incidentally explains the identification by Dryander of the Millerian specimen in Herb. Banks with *Cunila pulegioides*. This identification was made on the authority of Smith, who in the paper above named, having referred to *M. exigua* as "only known from Miller's specimen," writes (p. 21):

"Every practical botanist will readily conceive my joy, when in the summer of 1793 I found the same plant growing in the garden of my friend Edward Hassell, Esq., of Ipswich, where it was shown to me as an unknown mint. It grew in an American border, and was said to have sprung up spontaneously. As this border had been furnished with bog-earth from the neighbourhood of Ipswich, it was to be presumed the roots had been introduced along with it. Here then was *Mentha exigua* restored to an English Flora, and I made haste to distribute specimens among those who were solicitous to possess such a treasure. The flowers were not advanced enough to determine whether it were really a *Mentha*; the root being fibrous, instead of creeping, was very suspicious; and this circumstance decided it to be no variety of *M. Pulegium*, though in smell no two plants could be more similar. Roots were sent to Mr. Fairbairn at

Chelsea, and fresh specimens to Mr. Sowerby, for his *English Botany*; but the latter were luckily not in a sufficiently perfect state to be drawn. I say *luckily*, for this ill-fated *Mentha* proves after all to be a non-entity, a casual inspection of the Linnean Herbarium having lately satisfied me, that it is neither more nor less than *Cunila pulegioides*."

It will be observed that Smith speaks of his inspection as "casual," and the resemblance between the two plants is so striking that at first sight they might well be regarded as identical. In order that the matter might finally be laid at rest, I asked Mr. Wilmott—who had examined the Banksian specimens and stated (Journ. Bot. *l. c.*) that the flowers showed conclusively that the plant was correctly referred to *Pulegium* as opposed to *Mentha*—to examine the specimen from Miller which is the type of Linnæus's *exigua* and at the same time to see the specimen in Smith's herbarium on which he determined it to be *Cunila pulegioides*. Mr. Wilmott finds that the latter determination is correct, but with regard to *M. exigua* the Linnean specimen is identical with the Banksian specimens but not with the *Cunila*. The plant will therefore retain the name bestowed upon it by Hudson (Fl. Angl. ed. 2, 254)—*Mentha Pulegium* L. β. *exigua*.

Smith's paper contains an interesting note as to the provenance of the specimens from Miller which are in his herbarium. Miller's collection, as is well known, was bought by Banks (see Journ. Bot. 1913, 132), but Smith tells us (*l. c.* 20) that Banks, "not solicitous to encumber his herbarium with doubtful specimens, very obligingly presented me with a number of unsettled mints from Miller's herbarium." Among them was a plant with an inscription in Buddle's hand, which "there can be no doubt [was] the original specimen gathered by Buddle in company with Mr. Francis Dale" at Stoke Newington, as mentioned by Dillenius in R. Syn. ed. 3, 232, n. 2.

TROPICAL AMERICAN RUBIACEÆ.—X.

By H. F. Wernham, D.Sc., F.L.S.

(Continued from p. 285.)

Among the plants of Triana's herbarium sorted under *Psychotria* I have found the following, which closer examination has revealed to be a new genus. In Triana's manuscript list it is assigned to *Bertiera*, which it resembles in some respects, and I have adopted for its name an anagram of *Bertiera*; it belongs undoubtedly to the same tribe (*Hamelieæ*) as my previous genus *Pseudohamelia*, which is its nearest affinity. From this genus it is readily distinguished by the inflorescence, a forking cymose panicle, by the pentamerous flowers with narrow linear corolla-lobes, and by the length and insertion of the stamens.

Raritebe Wernham. Rubiacearum e tribu Hameliearum novum genus. *Calycis* tubus tubulari-campanulatus breviter 5-dentatus.

Corolla tubulosa insuper parum ampliata, fauce glabra; limbi lobi 5, lineari-oblongi obtusiusculi, imbricati. *Stamina* 5 corollæ in basi inserta, filamentis longiusculis; antheræ dorso-basifixæ inclusæ lineari-oblongæ, primo syngenesiæ. *Discus* majusculus, carnosus breviter cylindricus glaberrimus. *Ovarium* biloculare; stylus longus filamentosus, stigmate breviter bilobato; ovula in loculis perplurima, placentis septo insuper affixis inserta. *Bacca* parva pisiformis, calycis dentibus minutis coronata, bilocularis polysperma. *Semina* inter minima, globosa, testa alveolata. Frutices v. arbores, *foliis* oppositis breviter petiolatis membranaceis, *stipulis* integris interpetiolaribus, plus minus persistentibus. *Flores* parvi in cymas paniculatas terminales laxiusculas dispositi, pedicellati, bracteis paucis minutis.

Raritebe palicoureoides, sp. unicum. Frutex glabratus ramulis gracilibus lævibus in novitate minute præsertim prope nodos hirtellis, complanato-sulcatis; rami mox cortice striato-rugosulo cinereo induti, nodis plus minus tumidis. *Folia* ampla, glabra, papyracea elliptica utrinque graciliter acuminata, basi in petiolum brevem leniter angustata, apice acutissima; venæ supra vix conspicuæ impressæ, subtus prominulæ reticulatione manifesta, secundariæ utrinque ca. 15; *stipulæ* parvæ lanceolatæ acuminatæ acutæ. *Cyma* subcorymbosa, laxiuscula floribunda, minute pulverulento-hirtella, pedunculo elongato gracili, floribus plerumque longe necnon tenuiter pedicellatis, bracteis nisi principalibus ± 3 in inflorescentiæ basi minimis setaceis minutis. *Calyx* glaberrimus dentibus minutis. *Corollæ* tubus cylindricus utrinque glabræ insuper nec ampliatus, lobos anguste oblongos obtusos duplo excedens. *Bacca* parva glabra globosa.

Hab. Colombia, Susumino, at 1300 ft., and Villavicenia, at 3000 ft. *Triana* 1825!

A shrub, with *leaves* 12 to 17 cm. long and 4 to 6 cm. wide; petiole usually less than 1 cm. in length. *Stipules* barely 5 mm. long. *Peduncle* 4–5 cm.; *pedicels* 4–5 mm. long. *Calyx* (with ovary) 3–4 mm. long, 1·5 mm. wide at the mouth. *Corolla*-tube 5–6 mm., lobes 3 mm. long and ·75 mm. broad. *Anthers* 1·9 mm. mm. long; *style* 2·2 mm. long. *Berry* 3–4 mm. in diameter. *Seeds* minute, deeply and coarsely pitted.

This genus and *Neobertiera* (Journ. Bot. lv. 169) are members of the tribe Hamelieæ which have come to light since the publication of my Key to the genera of Tropical American Rubiaceæ (Journ. Bot. liv. 331). The complete clavis of this tribe should now stand revised thus:—

HAMELIEÆ.

Calyx-lobes equal.
  Ovary 4–5-locular.
    Corolla contorted in æstivation.
      Flowers 4-merous.................................. *Neobertiera.*
      Flowers 5-merous.................................. *Bertiera.*
    Corolla imbricate.
      Corolla markedly tubular, usually 5-angled . *Hamelia.*
      Corolla shortly funnel-shaped .... *Bothriospora.*

Ovary 2-locular.
Anthers exserted; inflorescence axillary......... *Hoffmannia.*
Anthers included; inflorescence terminal.
Flower 4-merous; filaments obsolete .... *Pseudohamelia.*
Flower 5-merous; filaments rather long ... *Raritebe.*
One calyx-lobe foliaceous .... *Otocalyx.*

Psychotria (§ Eupsychotria) **melaneoides**, sp. nov. Frutex nisi hic inde minute necnon obscure pulverulentus inflorescentia glaberrimus, ramulis ramisque graciliusculis lævibus striatis in siccitate nigrescentibus, sulcato-complanatis. *Folia* papyraceo-coriacea ampla ovato-elliptica, basi præsertim superiora obtusissima, rotundata, v. subtruncata, apicem versus parum acuminata subacutum, petiolo necnon modico; venæ utrinque prominulæ conspicuæ, centralis quoque in latere principales circa 6, reticulatione interveniente conspicua; *stipulæ* brevissimæ latæ oblongæ caulem amplectentes bicornutæ, aristis brevibus distantibus patentibus acutissimis. *Flores* inter minimi in cymularum paucifiorarum densarum longiuscule pedunculatarum thyrsum terminalem laxum amplum dispositi, *bracteis* minimis setaceis paucis. *Calyx* campanulatus breviter obtuse necnon late lobatus; *corolla* subcarnosa tubo tubulari subangulato insuper parum ampliato, intus insuper dense barbato, lobis oblongis obtusis patentibus tubi dimidium vix excedentibus. *Stamina* longiuscule exserta, antheris linearibus conspicue versatilibus.

Colombia, Barbacoas: *Triana* 1660!

A striking species, with shining *leaves* 9–15 cm. × 4–7 cm., with stalks up to 15 mm. in length. The *stipules* sheathe to a height of about 3 mm., bearing two sharp prongs on each side of the stem, each about 3 mm. long. The whole *inflorescence*, a pyramid up to 10 cm. or longer and the same width at the base, is carried on a *peduncle* 9 cm. or more in length; the primary lateral branches of the main rachis are bare, and some 2 cm. to 3 cm. long; and these bear laterally the peduncles of the actual cymules, the units of this characteristic inflorescence; these peduncles are 1 cm. or longer, and are themselves sometimes branched. The cymule, the unit of inflorescence, consists of 6 to 12 sessile flowers seated on the somewhat enlarged apex of the peduncle and subtended by a minute involucre of sepal-like bracts. The few scattered bracts of the inflorescence-branches never exceed 2 or 3 mm. in length. The whole *calyx* barely exceeds 1 mm.; *corolla*-tube, 3 mm., lobes 1·5 to 2 mm. *Anthers* 2 mm. long.

Psychotria (§ Eupsychotria) **canephorantha**, sp. nov. Arbuscula subramosa duodecimpedalis glaberrima, ramulis gracilibus ramisque valde sulcatis, nodis manifeste nodoso-tumidis. *Folia* coriacea supra subnitentia, plerumque elliptica, basi cuneata necnon in petiolum brevissimum validumque angustata supra alte canaliculatum, apice parum acuminata obtusa; venæ utrinque prominulæ, laterales principales utrinque ca. 6, reticulatione intercalata laxa conspicua; *stipulæ* vaginam tubularem brevem cylindricam truncatam formantes. *Flores* albi cymularum pauci- (3–5-)florarum sessiles racemum vel nonnunquam spicam, foliis multo breviorem dispositi, *bracteis* minutis. *Calyx* infundibularis sulcatus limbo subtruncato v. obscure late necnon minute sinuato-dentato. *Corollæ* glaberrimæ tubus insuper paullo ampliatus anguste infundibularis, lobi 5 patentes oblongi obtusi, tubi dimidium longitudine subæquantes. *Stamina* conspicue exserta, antheris breviusculis versatilibus.

Eastern Peru: in recent woods, near Tarapoto, August, 1855, *Spruce* 4120!

Related, apparently, to the preceding, which it resembles in the arrangement of the sessile flowers in indefinite inflorescences of cymules. The whole plant is strictly glabrous. The tough *leaves* are from 7 to 12 cm. long and 3 to 5·5 cm. wide; the petiole does not exceed 5 or 6 mm. The leathery, corky *stipule*-sheath is at most 2 mm. deep. *Inflorescence* about 6 cm. long, of which 2 to 3 cm. is occupied by the peduncle, and rarely more than 2 cm. wide. Total *calyx*, 1·5 mm. long. *Corolla*-tube 4 mm., lobes 2–3 mm. long. *Stamens* exserted 2–3 mm.; anthers, 1·5 mm. long.

Palicourea hedyctoides, sp. nov. Frutex glaber, ramulis lævibus subteretibus striatis rufescentibus. *Folia* inter minora, firme chartacea, lanceolata salicina longe necnon graciliter acuminata acuta, basi acuta in petiolum brevem angustata; *stipulæ* membranaceæ in vaginam brevissimam persistentem aristis utrinque duobus setaceis distantibus brevibus onustam connatæ. *Flores* in thyrso laxo plus minus folioso dispositi plerumque nonnunquam longiuscule pedicellati majusculi, *bracteis* nunc minusculis subsetaceis nunc foliosis nonnunquam foliis vegetantibus subsimilibus, hinc inde sparse dispositis. *Calycis* lobi lanceolati acuti conspicui tubum excedentes. *Corollæ* tubus curvatus basi gibbosus obliquus insuper sub lobos ampliatus oblongo-ovatos patentes obtusos. *Stamina* 5 antheris suberectis exsertis linearibus.

Ecuador: In valle Lloenti inter arbores, alt. 9000 pedes. Floret September, October. *Jameson* 336!

Very distinct in its small, willow-like *leaves* 4 cm. × 1 cm. to 8 cm. × 2·5 cm., shining above, recalling some species of *Hedyotis* with their close conspicuous venation with 12 or more main veins on either side of the midrib. The *stipules* are small but manifest, reduced to two distant setæ, 2 or 3 mm. long, joined across the stem by little more than an interpetiolar line. The reddish shining branchlets end in a pyramidal lax *inflorescence* about 12 cm. long and the same in diameter at the base. The flowers are very typical of the genus, on *pedicels* as much as 6 mm. long. *Calyx*-tube 1·5 mm., lobes 2 mm. long. *Corolla*-tube 8–9 mm. long, widened to 4 mm. or more at the mouth; lobes 3 mm. × 1·5 mm. at the base. The *anthers* are exserted just beyond the mouth of the corolla, and are 2 mm. in length.

Palicourea lyristipula, sp. nov. Frutex v. arbor ramulis sulcato-complanatis quadrangularibus dense pubescentibus, nodis sæpe conspicue tumidis. *Folia* ampla majuscula firme chartacea obovata v. elliptica basi in petiolum brevem angustata apice obtusa parum acuminata, supra nisi in vena centrali nonnunquam patente pubescentia v.

hirtella glabra, subtus præsertim in venis plus minus conspicue necnon densiuscule pubescentia brunneo in siccitate discolora; venæ supra impressa tamen manifestæ, subtus prominentes utrinque laterales principales 12–15; *stipulæ* late ovatæ amplæ longe persistentes coriaceæ apice in partibus 2 lanceolatis acutis divergentibus vix ad dimidium fissæ. *Flores* in thyrso laxiusculo multifloro elongato dispositi terminali subcylindrico folia longe excedente, plerumque pedicellati, rachide plus minus glabrescente alte sulcato, brachiis lateralibus pro rata gracilibus necnon breviusculis; *bracteis* cum bracteolis parvis subsetaceis inconspicuis. *Calyx* glabrescens sparsiuscule hirto-pubescens, tubo oblongo insuper parum ampliato, limbo infundibulari extra medium in lobos oblongo-lanceolatos obtusissimos diviso. *Corolla* tubularis insuper paullo ampliata extus glaberrima, lobis parvis reflexo-patentibus ovatis obtusis. *Antherarum* apices vix exserti.

Colombia (without further locality): *Triana* 130! *Linden* 1081!

Very distinct in its broad *leaves*, pubescent beneath, 9–17 cm. × 5–8 cm., and the conspicuous *stipules* enclosing swollen nodes, 1·3 cm. long and the same in breadth; *petiole*, 1 cm. or longer. *Inflorescence* 20 cm. or more in length, and not more than 7 cm. in the widest part. *Pedicel*, 5 mm., or longer. *Calyx*, 5 mm. long in all, of which the lobes occupy over 2 mm. *Corolla*-tube, 12 mm., 3–4 mm. wide at mouth; lobes 2 mm. × 1 mm.

The affinity is with *P. Aschersoniana*, from which our species is readily distinguished by the different indumentum, the stipules, and the absence of leafy bracts.

Palicourea caprifoliacea, sp. nov. Frutex subglaber, ramulis alte sulcatis tardius subteretibus, novitate glabratis gracilibus virgato-rectis, mox validiusculis. *Folia* firme chartacea plerumque elliptica nonnunquam oblanceolata, utrinque acuminata apice acuta basi in petiolum brevem angustata, supra glabra subnitentia venis impressis, subtus dilute discoloria venosissima venis prominentibus approximatis, lateralibus principalibus utrinque ca. 15, nisi in venis sparse pubescentia glabra; *stipulæ* membranaceæ amplæ persistentes, basi caulem vaginantes insuper ad dimidium bifidæ. *Flores* parvi in thyrsis amplis laxiusculis floribundis dispositi folia parum excedentibus, rachide necnon brachiis gracilibus subæqualibus; *bracteis* minutis v. minusculis paucis setaceis inconspicuis, pedicellis brevissimis vel obsoletis. *Calyx* minimus brevis late obtuse lobatus, *corollæ* basin tumidum arcte amplectens, brevis insuper ampliatæ infundibularis, extus glaberrimæ, lobis parvis reflexis ovatis obtusis. *Stamina* 5, antheris erectis linearibus apicibus modo exsertis.

Colombia: *Linden* 1080! Santa Rosa, 5500 feet, *Triana* 127 (=1665)!

Distinct in the conspicuously-veined leaves, and the very numerous small flowers in the spreading and abundant panicles. *Leaves* 8–13 cm. × 2·5–5 cm., with stalk 5–15 mm. long; *stipules* ±1 cm. × 5 mm. *Inflorescence*, about 12 cm. long and 9 cm. in the widest part. *Calyx* barely exceeding 1 mm. in all; *corolla*-tube 4 mm. long, the lobes barely 1 mm., and 2 mm. wide at the mouth.

Palicourea perquadrangularis, sp. nov. Frutex glaber sempervirens, ramulis gracilibus cum ramis mox validiusculis lævibus striatulis recte quadrangularibus angulis nonnunquam fere subalatis. *Folia* majuscula ampla chartacea elliptica utrinque acuminata apice subacuta basi in petiolum nonnunquam longiusculum angustata, utrinque nisi subtus in venis præsertim centrali hirta glabra, utrinque venosa, venis approximatis lateralibus primariis utrinque ca. 16; *stipulæ* vaginam persistentem formantes insuper utrinque 2-aristatam, aristis distantibus vaginam subæquantibus. *Flores* glabri parvi tamen latiusculi, plerumque longe pedicellati, in thyrso amplo nonnunquam elongato dispositi laxiusculo, *bracteis* parvis setaceis paucis inconspicuis, in alabastro ovato-fusiformi apice subobtusi. *Calyx* brevis tubo supra basin tubulari angusto insuper in limbum ampliusculum subito ampliatus, lobis latis ovatis obtusis brevibus corollæ basin tumidum arcte amplectentibus. *Corolla* breviuscula tubo validiusculo insuper vix ampliata, apice brevissime lobata.

Venezuela: *Funck and Schlim* 542! Prov. Tovar, Merida, in moist shady woods, flowering in May and June, *Moritz* 848! Caracas, *Linden* 281! Muña, *Pearce* 12!

Distinct in its square stems and small blunt oval buds on long delicate pedicels; allied apparently to *P. petiolaris*, but readily separated by the foregoing characters. *Leaves* 12 cm. × 4·5 cm. to 25 cm. × 8 cm.; with petioles to 2 cm. or longer. *Stipule*-sheath 5–10 mm., the aristæ of about the same length. *Inflorescence* 12 cm. or longer, and 12 cm. in diameter at the base. Total *calyx* 2·5–3 mm. long, the narrow lower part about 1·5 mm. *Corolla*-tube 6 mm. long, 3 mm. in widest part; lobes 1 mm. long.

(To be continued.)

NOTES FROM THE NATIONAL HERBARIUM.—IV.

By James Britten, F.L.S.

(For preceding Notes see Journ. Bot. 1907, 313; 1909, 41; 1915, 272.)

Clematis rosea.

In a paper on "Smith's Georgian Plants" (Journ. Bot. 1898, 302) I followed Smith (*Insects of Georgia*, ii. 201) in identifying *C. rosea* of Abbot's drawings with a plant from Kew Gardens in the Banksian Herbarium which Smith, adopting Abbot's name, described as a new species. Abbot lettered his original drawing "Clematis Rosea Nova sp. C. Reticulata Walt. Flo. Carol. 186," but Smith in reproducing this added a query to each of the names—a misleading alteration; Smith's figure by no means accurately reproduces Abbot's drawing, but even as altered this does not strikingly resemble *C. crispa*, the name attached to the Banksian specimen in Solander's hand. On looking again into the matter, I am quite unable to discover upon what grounds Smith based his conclusion as to the identity of the Kew Garden plant with Abbot's figure. On this assumption, however, he rejected Abbot's association of his plant with Walter's *C. reticulata*, mainly on the ground that the fruit of the Kew specimen (with which Abbot was of course in no way concerned) did not agree with Walter's description; but as Abbot does not figure the fruit, it is difficult to see what this can have to do with the case. Why Abbot called his plant a new species cannot be ascertained, as it would seem he regarded it (apparently correctly) as identical with *C. reticulata.* The original drawing—and indeed for that matter Smith's figure—agrees better with *C. reticulata* than with *C. crispa*, and Abbot's figure is cited by DeCandolle (Syst. i. 157, Prodr. i. 8) under *C. reticulata* as "*C. rosea* Abbot. insect. am. ic." The specimen and the figure should thus be referred to different species:

C. rosea Abbot ex Sm. Insects of Georgia, ii. t. ci. = *C. reticulata* Walt.

C. rosea Sm. op. cit. p. 201 = *C. crispa* L.

STALAGMITIS CAMBOGIOIDES Murray, Comment. Goetting., ix. 173 (1789).

This name is placed by M. Vesque in his monograph of the *Guttiferæ* (Mon. Phan. Prodr. viii. 193) under two species—*Garcinia spicata* Hook. f. (*Xanthochymus ovalifolius* Roxb. (p. 310) and *G. Morella* Desr. (p. 472), "quoad synonymiam tantum." Vesque refers to Planchon and Triana, who in their *Mémoire* place it under *G. spicata*, and write: "descriptione ex schedulis pluribus Kœnigii perperam confusis et male interpretatis plane erronea et exclusis synonymis" (Ann. Sc. Nat. 4th series, xiv. 304 (1860). The identity of the plant is discussed at length by Robert Graham in his "Remarks on the Gamboge Tree of Ceylon" in Comp. Bot. Mag. ii. 193–200 (1836–7)—a paper which the mention of "Graham" by the authors last cited indicates that they had seen, though they make no other reference to it. Murray described his plant from portions of a specimen collected in Ceylon by J. G. Koenig and sent to him by Banks, with the collector's observations. At Graham's request, Brown examined the specimens of Koenig in the Banksian Herbarium; having done so, he wrote: "The plant sent pasted by Koenig to Sir Joseph Banks as one specimen, I have ascertained to be made up of two plants, and very probably of two genera. The union was concealed by sealing-wax. The portion in flower, and which agrees in structure with Murray's account, is, I have no doubt, the *Xanthochymus* of Roxburgh. *Stalagmitis* and *Xanthochymus* are therefore one genus . . . . This, however, forms but a small part of the whole specimen, the larger portion being, I am inclined to think, the same with your plant [*G. Morella*]. . . . The structure of this greater portion cannot be ascertained from the few very young flower-buds belonging to it . . . A loose fruit, pasted on the sheet with König's plant, probably belongs to the larger portion, and resembles Gærtner's *Morella*" (op. cit. 197). Neither of the monographers appear to have seen this specimen, which in every way corresponds with Brown's description. It is endorsed by Koenig "Arbor Gummi Guttæfera vera! inter grandis mediocris. Gothathu Gokathu vel Bokathu cingalensibus"—which are among the synonyms quoted by Murray.

BURCHELLIA CAPENSIS R. Br.

The plant generally known by this name can hardly retain it. It is the *Lonicera bubalina* of Linn. Suppl. (146) and Sims figures and describes it as *B. bubalina.* He quotes Brown's later name, but says: "We can by no means approve of altering the specific name, which, when once established, should remain inviolate, except for very particular reasons; we have therefore thought it right to restore the name of *bubalina*." As the making of a new combination is not involved, it may be worth while to call attention to the name, which, with synonymy, should stand as follows:—

BURCHELLIA BUBALINA Sims, Bot. Mag. 2359 (Aug. 1822).
Lonicera bubalina Linn. Suppl. 146 (1781).
Cephaelis bubalina Pers. Syn. i. 202 (1805) et auct. plur.
Burchellia capensis R. Br. in Bot. Reg. 466 (1820) et auct. recent.

"The shrub is called Buffelhorn (Buffaloe-horn) by the Dutch colonists at the Cape from the hardness of the wood, according to Mr. Masson" (Bot. Reg. l. c.): to this the Linnean name *bubalina* refers, although W. Smith (Lat. Engl. Dict.) enters the word as "pertaining to the African gazelle." In the Solander MSS. (v. 643–7), under *Lonicera bubalina*, is a full description in Bacstrom's hand, doubtless transcribed from Masson's MSS.: at the end of this is a table showing how the plant differed from other genera of *Rubiaceæ*, to which it had been ascertained by Jussieu to belong. There are specimens from Masson in Herb. Banks, the locality of which is stated (in Sol. MSS.) as "in sylvis Houtniquat trans Krom Rivier."

DIGITALIS TOMENTOSA Sims. Bot. Mag. t. 2194 (1821).

This plant seems to have been overlooked in Ind. Kew., probably because it was considered identical with *D. tomentosa* Hoffm. & Link. (Fl. Portugaise, i. 220, 1809). Sims, however, diagnoses his plant as new, and, after a full description, continues: "We have not found any thing said about this species, but are informed that it was received from Vienna under the name that we have adopted, by Mr. Anderson, of the Chelsea garden, where it flowered, and our drawing was taken in June, 1819. But we find by a specimen from Philip Miller, now in the Banksian Herbarium, that it was cultivated by him, and supposed to be *Digitalis Thapsi.* From which, however, it seems to differ in many material points, as in the leaves being of the same colour on both sides, supported on long foot-stalks, not sessile; in the greater length of the bractes; in the flowers not being secund or looking one way, and of a brighter colour. These plants are, however, too nearly allied, and perhaps may only be varieties of the same species." The sheet containing Miller's specimens bears a note by Robert Brown: "a *Thapsi* differt calycis foliis cordatis ovato-lanceolatis (nec lanceolato-ovatis) bracteis acuminatis pedunculos superantibus foliis utrinque pubescentibus concoloribus." It is however, probably a form of *D. Thapsi*, and is not identical with *D. tomentosa* Hoffm. & Link, which is referred to *D. purpurea.*

CHLORANTHUS INCONSPICUUS Sw. in Phil. Trans. lxxvii. 359 (1787).

"Viva allata fuit e China in Angliam a Jac. Lind. D. M. anno 1781. Floruit dum navis *Atlas* adveheret" (L'Héritier, Sert. Angl. i. p. 36). We have in Herb. Banks a specimen endorsed by Solander "Floruit in nave *Atlas* sub itinere." Swartz's description and figure (l. c.) were from specimens in the Royal Garden, Kew. to which it was introduced by Lind. There is a very full description by Dryander in the Solander MSS. Cultivated specimens from Hort. Kew (1782 & 1784) and one from Loureiro (*Creodus odorifer* Lour. Fl. Coch. 89) are also in the Herbarium.

EUPHORBIA HELENIANA Thellung & Stapf.

This endemic species, first described in Kew Bull. 1916, 201, was collected by Banks and Solander at St. Helena in May, 1771, from whom two specimens are in the Herbarium. It appears in their MS. list of the plants of the island as *E. Chamæsyce*, and is fully described under that name by Solander (Sol. MSS. xi. 405), who prefaced his description by the note: "Planta in Insula Stæ Helenæ lecta in paucis discrepat & forte distincta species, tota glaberrima"—glabrescence "omnium partium" is one of the characters by which Thellung and Stapf distinguish the plant from *E. Chamæsyce*. It may be worth while to transcribe Solander's description, which, as comparison with that published in the Kew *Bulletin* will show, includes other of the points relied on for differentiation:—

"*Caules* teretes, ramosissimi, subdichotomi (videntur annui etsi prope basin lignosi). *Rami* alterni, patentes, subdichotomi. *Folia* opposita, petiolata, patentia, ovalia, obtusa, obsoletissime serrulata, sæpe integerrima, lævia, plana, subsucculenta, læte viridia, immaculata, subtus glaucescentia, tres lineas longa. *Petioli* brevissimi (semilineares). *Stipulæ* interpetiolares, utrinque binæ e basi latisculæ, subulatæ, apice setaceæ, longitudine petiolorum, deciduæ. *Pedunculi* e dichotomiis axillares, solitarii, capillares, uniflori, petiolis paulo longiores. *Fructus* glaberrimi."

Dr. Hemsley, in the valuable but extravagantly printed and badly arranged volume devoted to the *Botany of the Voyage of H.M.S. Challenger* (part ii. p. 82), noted that he was unable to match the plant, which he placed doubtfully under *E. Chamæsyce*, but hesitated to found a new species "upon what may be only a slightly altered state of some well-known one, or even exactly the same as a described species." It is the only member of the genus in Dr. Hemsley's list, but we have a specimen of *E. Helioscopia*, collected by Banks and Solander—of course introduced, but not mentioned by Melliss, who includes *E. Peplus*.

The statement in Mr. Guppy's *Plants, Seeds, and Currents* (p. 460) that there is "no indigenous species of *Euphorbia* in St. Helena" is thus inaccurate, but the record in the *Bulletin* was not published until after his book was printed.

EDWARD RUDGE'S HERBARIUM.

The collections of Edward Rudge (1763-1846), consisting of a general herbarium of 4318 specimens and 772 plants collected in Guiana by Martin, were presented to the British Museum by his widow in 1847, and have been incorporated with the National

Herbarium so far as additional thereto. The following note by Rudge, which accompanied the collection, may as well be placed on record: "This Herbarium consists of the following collections: Dickson's British Plants published in Fasciculi and also his Fasciculi of Italian specimens, the other British Plants were collected by Samuel Rudge, Esq., in the neighbourhood of Elstree [Herts], together with such garden specimens as were contained in his Hortus Siccus, and the others were collected in several other counties by myself. [W.] Torner's Herbarium, which forms the chief part of this collection, was purchased for £21 and was principally formed by him during the time he acted as Librarian at Sir Jos. Banks's, from the duplicates in the Banksian Herbarium, and it also contains many specimens collected by him in the North of Sweden and from the Botanic Garden at Upsal. The Ericæ were given to me mostly by Mr. Salisbury, from whose catalogue of the genus in the Linn. Trans. they are named. The Fuci were chiefly from the collection of Dawson Turner, Esq. The whole have been carefully examined and compared with the Banksian Herb. and are marked in the left-hand corner HB to show that they correspond with the specimens in that Herbarium." Some of Turner's sheets are endorsed "not in H.B."—an indication which in many cases had ceased to be correct at the date when the herbarium was acquired. In R. Brown's correspondence is a letter (30 April, 1845) from Thomas (Ignatius Maria) Forster in which he mentions that among letters addressed to his father (Thomas Furley Forster) were some from Torner dated from Banks's library (Soho Square) relating often to Afzelius.

SALISBURY'S DRAWINGS OF ERICA.

There are in the Herbarium a number of small admirably finished drawings in ink, by R. A. Salisbury, of the flowers and leaves of various species of *Erica*, the history of which I have only lately ascertained. When I first knew them they were among other drawings in the Department, but as they were clearly connected with Salisbury's work in the Banksian Herbarium, which his notes on the sheets show to have been very considerable, it seemed best for convenience of reference to add them to the sheets. At the same time a number of fragments bearing Salisbury's names, which were in packets in a little box, were in like manner incorporated; the history of these is given by Salisbury in his preface to his second edition of Thunberg's *Dissertatio de Erica* (1800). Having explained that in this, "editoris potius quam correctoris officium susceperim," and that he had reprinted the work textually, adding a few notes, he points out the necessity of knowing the true characters of species "sæpe perplexas," and continues: "Frustulum igitur plurium rariorum *Ericarum* in hac monographia, quas vivas colo, ingratiam indoctorum delineavi, tum Folio, tum Anthera, ubi res ita postulabat, seorsim additis." The figures, to the number of twenty-four, which appear on the plate accompanying the *Dissertatio*, are selected from the drawings, which show many more details than are here reproduced.

Other figures, giving details of various species, will be found in vol. iii (pp. 289–292) of the too little known collection of Salisbury's drawings and MSS., also in the Department of Botany.

SEPTORIA CHENOPODII:

AN EXAMPLE AND A WARNING.

By W. B. Grove, M.A.

There is a certain imperfect fungus parasitic on *Atriplex* and *Chenopodium* to which great interest attaches. The late M. C. Cooke found it at Holloway, in July 1866, forming spots on the leaves of *Atriplex*, and issued it in his *Fungi Britannici* as no. 148, under the name *Phyllosticta Atriplicis* Desm. Though suitable places where its host could grow are now much rarer in that thickly inhabited part than they were in Cooke's time, a visit to Holloway in August last showed that the fungus still occurred in plenty there, and it was easily found also at Highgate, East Finchley, Wembley, Harrow, Greenford, Brentham, and Hampton Wick, all towards the same side of London. Nevertheless it appears to be somewhat local, for records in other parts of Britain are few in number. It seems, furthermore, to be distributed throughout the temperate northern hemisphere, both European and American, and to occur on many species of *Atriplex* and *Chenopodium* without much altering its morphological characters.

But an examination of Cooke's specimens shows that, though most of the spores are one-celled (as they should be in *Phyllosticta*), yet there are a number which are two-celled, while a long-continued search of specimens from other localities will enable one to discover not a few which are distinctly and plainly triseptate, and even one among about a thousand spores which has five septa. With the one septum, the spores would suggest the genus *Ascochyta*; with the three or five septa, the genera *Septoria* or *Stagonospora*. But still further, the fungus occurs, though more rarely, on the stems, and in that case by those who follow the, let us say, to avoid offence, the *Chinese* method adopted in Rabenhorst's *Kryptogamen-Flora* by the excellent Allescher, the two-celled form would be placed in the genus *Diplodina*. For Allescher's wooden dictum is—*Ascochyta* on the leaves, *Diplodina* on the stems; no other distinction being considered or even suggested. On the stems, it should be noted, the spots occupied by the fungus are not at all well marked, but the spores are the same.

Under these circumstances it is not surprising that the fungus has been found by many different mycologists, and has received many different names. A study of the synonymy will be at once an example of the varying forms which one fungus can assume on its way to full development, and a warning of the necessity of making greater allowance for this variability (on certain fixed lines) than is usually done, before concluding that one has found a new species. It is premised that the spores have a peculiar shape and character which is easily recognisable by the expert, and that all the variations in the colour of the spots, size of the spores, etc., alleged by the different authorities quoted, can be found in the same locality on the same host, if the investigation be continued long enough. For example, though the width of the spores is variously given as from 3 to 6 μ, all these widths may on occasion be found simultaneously by examining the contents of one single pycnidium.

It may be asked how one is to decide between the genera *Ascochyta* or *Diplodina* on the one hand, and *Septoria* or *Stagonospora* on the other. Some might suggest that the two former and the two latter respectively should be more or less merged in one. Apart from their convenience, however, the working mycologist knows that they are sufficiently distinct, though he may find it difficult to define the distinction. Such a state of things seems to be not unknown in other branches of human knowledge.

The required distinction can be found in the nature of the pycnidium. In *Ascochyta* and *Septoria* the tissue of the very delicate pycnidial wall is composed (except round the ostiole) of slender interwoven hyphæ which wind round one another like intertwined snakes preparing for hibernation. For this Potebnia has suggested the unmeaning term "pseudo-pycnidial"; it would be better to call it *plectenchymatous*. The firmer wall of *Diplodina* and *Stagonospora*, on the contrary, is composed of more or less hexagonal (polyhedral) cells, in close contact with one another on almost all sides, forming a tissue known as "pseudoparenchymatous," a word which under the circumstances might without confusion be shortened to *parenchymatous*. Round the ostiole, even in *Ascochyta* and *Septoria*, the tissue becomes weakly parenchymatous.

The wall of the fungus under discussion belongs to the *Septoria* type: the true name and synonymy will therefore be as follows. It will be seen that Saccardo has listed it at least eight times, and Allescher six times. It will of course be understood that no account is taken here of possible biological distinctions.

Septoria Chenopodii Westd. Bull. Acad. Roy. Belg. 1851, p. 396. Sacc. Syll. iii. 556. Allesch. vi. 756.

Depazea vagans f. *atriplicicola* Fr. Syst. Myc. ii. 532.

Phyllosticta Atriplicis Westd. Bull. Acad. Roy. Belg. 1851, p. 397. Desm. Ann. Sci. Nat. 1851, xvi. 298. Sacc. Syll. iii. 54. Allesch. vi. 104.

P. Chenopodii Westd. Bull. Acad. Roy. Belg. ser. ii. vol. ii. no. 7. Sacc. Syll. iii. 55.

Ascochyta Atriplicis Lasch, in Rabenh. Herb. Mycol. ed. i. no. 861. Died. Annal. Mycol. 1904, ii. 180.

A. Chenopodii Rostr. Bot. Tidskr. 1905, xxvi. 311. Died. Annal. Mycol. 1912, x. 139.

A. nebulosa Sacc. et Berl. Bull. Soc. Bot. Belg. 1889, xxviii. 98. Sacc. Syll. x. 305.

Diplodina Atriplicis Vestergr. Bidr. Känned. Gotl. Swampfl. 1896, p. 19, f. 4. Sacc. Syll. xiv. 952. Allesch. vi. 679, fig.

D. Chenopodii Karst. in Hedwig. 1885, p. 73. Sacc. Syll. x. 315. Allesch. vi. 682.

Septoria Atriplicis Fckl. Symb. Myc. p. 390 (1869). Sacc. Syll. iii. 556. Allesch. vi. 737.

S. Westendorpii Wint. in Hedwig. 1887, p. 26. Sacc. Syll. x. 380. Allesch. vi. 756.

Stagonospora Atriplicis Lind, Dan. Fung. 1913, p. 444, pl. 6, figs. 79, 80.

In addition there are two American species, described as having much broader spores (7–11 μ), which may possibly be different:—

Stagonospora Chenopodii Peck, 40th Rep. N. York State Mus.
Phleospora Chenopodii Ell. et Kell. Journ. Mycol. 1888, iv. 26.

And also a third American species which is described as having elongate-elliptical spores, but does not seem to differ otherwise:—

Diplodina Ellisii Sacc. Syll. iii. 412 = *Diplodia hyalospora* C. et Ell. in Grevill. vii. 5 (1878).

Subjoined is the description of the fungus, as I have met with it:—

SEPTORIA CHENOPODII Westd.

Spots (on the leaves) roundish, at first pallid-green, then becoming ochraceous and dry with a narrow faint border-line. Pycnidia amphigenous, but mostly epiphyllous, numerous, often ± concentrically arranged, at first fuscous, then blackish, globose, 100–220 μ diam., with a slightly projecting pierced ostiole; texture yellowish brown, plectenchymatous, except round the darker ostiole. Spores cylindric-oblong, broadly rounded at the ends, often inequilateral or curved or bent, hyaline, but very faintly yellowish in mass, granular within or 2–8-guttulate, for a long time continuous, 12–16 × 3–4 μ, then usually 1-septate, in a few cases 3-septate or very rarely 5-septate. 18–28 × 4–6 μ (or even 7 μ) when mature.
On living leaves of *Atriplex* and *Chenopodium.*

Var. nov. EMACULATA maculis obsoletis. When on the stems there are no distinct spots and the pycnidia are scattered, but the spores are the same. This is equally true of the form recently found on the succulent leaves of *Atriplex Babingtonii* and its allies, on sandy sea-shores, Ayrshire, by Mr. D. A. Boyd.

SHORT NOTES.

POTAMOGETON UPSALIENSIS Tis. IN ENGLAND. Miss Ida M. Roper sent me in the autumn of 1916 specimens, collected in the preceding June, from a Millpond near Wool, Dorset, doubtfully named "*P. lucens* f." This year she has kindly sent me a series in the fresh state. It is one of a set of plants that come under *P. decipiens* Nolte (agg.), or at least are so placed by Graebner and Hagström. The original *decipiens* of Nolte is no doubt, as the late Mr. Fryer always contended, *P. lucens* × *perfoliatus*; but with their usual procedure Ascherson and Graebner (Syn. Fl. Mittenp. 329: 1897) reversed the order of the names. The series of names—*P. eu-decipiens*, *P. beroliensis*, *P. upsaliensis*, *P. salicifolius* and

P. Babingtonii—all placed by them under *P. lucens* × *prælongus* Caspary in *Das Pflanzenreich*, xxxi. 137, 1907, form a collection too diverse to be so included.

Tiselius originally described his plant as *P. upsaliensis* in Bot. Notiser, 1884, 15; later in his Pot. Suec. exsic. fasc. 11 (1895), he divided it into two species, *P. decipiens* and *P. upsaliensis.* In Bot. Notiser he had made it into two series A. and B., with three forms under each. Dr. Hagström (Crit. Res. Potamoget. pp. 243–245: 1916) establishes three new varieties under *P. decipiens* Nolte, and places the *upsaliensis* of Tiselius f. *genuinus* (l. c. Nos. 79, 80) and f. *intercedens* (No. 81) under his γ. *longifolius*—"Folia longiora subangustata, 150–200 mm. longa, ·20 mm. lata." To this I consider Miss Roper's specimens to belong, as they accord well with a series Dr. Tiselius sent me. Magnin (Bull. Soc. Bot. France, xliii. 443: 1896) places it under *P. decipiens* as a subspecies. Ascherson and Graebner in their latest work (Syn. Fl. Mittenp. ed. 2, 506: 1913) still retain it under *P. prælongus* × *lucens* as *P. upsaliensis*, but the involved nomenclature of the Synopsis is difficult to quote unless at great length, and the opinion of the authors (to me *in litt.*) is so variable that I place no dependence on their naming. Our plant following Dr. Hagström is *P. decipiens* Nolte var. γ. *longifolius* Hagst., Dr. Tiselius's name is cited only as a synonym: the making of new varieties and petty forms is one of the faults of Dr. Hagström's splendid work.—A. Bennett.

Lepidium campestre var. longistylum (p. 324).—I have by the courtesy of the Dublin Museum seen More's plant mentioned by Mr. Jackson: Miss Knowles, the curator, has added a reference to *The Natural History Review*, July 1860, p. 434. We find there under Proceedings of Societies: "The following paper by A. G. More, F.L.S., was read:— . . . . . *Lepidium campestre* . . . var. *longistylum*, with many stems springing from a biennial root, and the style, about twice as long as the notch, occurred in a cultivated field near Lunghall. This variety is likely to be mistaken for *L. Smithii*, but for its scaly pouch." This is apparently the only place of publication, but it appears valid. The variety, however, seems scarcely of note. Its styles are no longer than is common in *L. campestre*, but none of the siliculæ are mature, hence, as common in *L. campestre* at that stage of development, they are "twice as long as the notch." In mature fruit, the sides grow up and equal or exceed the style which does not lengthen. Syme (E. B. i. 217: 1863) mentions this, "The style should be examined in mature pods, as it considerably exceeds the notch until the wings are fully developed." The question remains as to whether the name should be retained, "descriptione emendata," as a many-stemmed variety. Syme says for *L. campestre*, "Stem sub-solitary . . . ." and "stem . . . . solitary and 2 or 3 from the same rosette." Thellung in his monograph (in Neue Denkschr. Schweiz. Ges. Naturwiss. xli. 1907—not 1906) says (p. 93), "Caulis fere semper unicus." Specimens in the National Herbarium show more than one stem, but the occurrence is rare. It is perhaps explicable by reference to what happens in *L. Smithii.* This is supposed always to have many stems, the fact being used as a diagnostic character by Thellung; yet a specimen from Portugal is clearly *L. Smithii* with a single central stem, clothed at the base with the remains of the rosette leaves. Townsend's remarks (Journ. Bot. 1903, 97) on the cultivation of his var. *alatostylum* explain what happens. The young plant first throws up a single terminal stem (and specimens are thus in the National Herbarium from Lancashire as well as Portugal) and this is succeeded by numerous stems from the axils of the root-leaves. Being a perennial, the simple stemmed plant is rarely found. *L. campestre* on the other hand, being a biennial, rarely goes beyond its single terminal stem. Until the cause of the rare cases when more than one stem occurs is elucidated, such plants are scarcely worth varietal rank, and More's plant is therefore indistinguishable from *L. campestre.* Mr. Jackson's remarks concerning the yellow-anthered *L. Smithii* are of interest. The styles, however, are no shorter than is common in the purple-anthered form. Examination of specimens tends to show that *L. Smithii* has two lengths of style, the longer (complete style, not only the "free part") 1·2 to 1·5 mm. long, the shorter about ·9–1·0 mm. long as in the Northamptonshire plant. But both forms may occur on the same raceme. The complete length of the style appears as in *L. campestre* to be, with the exception that there are two lengths, practically constant. The apparent length varies owing to the fact that the wings in maturing may be adnate to it for various distances, thus causing variations in the depth of the notch, but not in the length of the style. The question of *L. Smithii* with yellow anthers requires more study; no other specimens than those cited by Mr. Jackson are known to me.—A. J. Wilmott.

Sedum Drucei (p. 256). As I took part in the International Phytogeographical Excursion in 1911 and was present when Prof. Graebner pointed out that the British *Sedum acre* was different from the Continental, I took interest in the matter—the more so because I could not see any essential difference. Since then I have had in cultivation here in Copenhagen:—(1) *S. Drucei* obtained from the Botanical Garden of Berlin, undoubtedly part of the offspring of the original plant sent home by Prof. Graebner from England; (2) *S. acre* collected by myself in Scotland in 1912; (3) Danish plants of *S. acre*: and I fail to see any differences between them—at least, differences worthy of creating a species. I am therefore glad to learn that Mr. Lloyd Praeger has arrived at the same conclusion, and I agree with Mr. H. S. Thompson in regretting very much if the unfortunate naming of the British *S. acre* should be taken as a precedent to an "insular isolation" of the British flora by giving new specific names to the British races of plants common to the British Isles and the Continent.—C. H. Ostenfeld.

Cardamine pratensis L. Of this species Syme writes (Engl. Bot. ed. 3, ii. 159), "In damp seasons the stem frequently bears small bulbs at the base and buds on the leaves, which propagate the plant. The flowers are sometimes double, or rather the petals surround small flower buds instead of stamens and pistils, which are reduced to a rudimentary state." I look at this plant from another point of view. It is an early spring flowerer, which often can rarely for years together ripen proper seed on account of spring frosts. I was years before I could get seed of it, or of *Ranunculus Ficaria*, for my working seed collection. I soon discovered that where it did not ripen seed it could grow fresh plants from its leaves. Till quite lately the opportunity for studying the growth of these new plants was lacking, though I was perfectly certain it had nothing to do with damp seasons, for I have found most of my specimens in unusually dry ones, and the true double-flowered form twice. I have during the last few seasons discovered another thing which prevents *C. pratensis* developing seeds, and have been able to study fresh plant development under these circumstances. The same density of shade which prevents *Carex stricta* from flowering, though it has its filamentous sheaths and every other characteristic of the species, is sufficient to prevent *C. pratensis* from doing so; though *Poa trivialis* and *Agrostis alba* can just produce depleted spikes (v. *nemorosa*) to grow seeds. I have been watching an overshaded pond in a covert in Lincolnshire, to discover in what order the species departed as the overshadowing grew more dense. I discovered that at midsummer nearly every plant of *C. pratensis* was carrying a young plant on its leaves or had only just dropped it. I find that in this case, produced wholly by overshading, the new plant bud is produced at that spot on the upper leaflet where all the venation joins into one for the stalk of the leaf. As yet I have only detected them on the upper leaflet, never on the side leaflets, in these depleted plants, though often after they have lost connection with the parent leaflet, they slip down to another position, for their roots always clasp the leaflet stalk. Many of the leaves have lost all their leaflets but the terminal one in the shade. The time of year for the first sign of these budding plants is September or early October. They drop off the following summer. I am sending a sheet of specimens for the British collection at the National Herbarium.—E. A. WOODRUFFE-PEACOCK.

HERTFORDSHIRE PLANTS. The genera *Botrychium* and *Colchicum* are not represented in Pryor's *Flora of Hertfordshire.* As to the former, the following entry occurs in Babington's diary for 1882: "June 7. We went with Professor and Mrs. Cowell to Mr. Pollard's, at High Down, near Hitchin. We found *Botrychium Lunaria* for the first time in Herts" (*Memorials of Babington*, 234). As to the latter, Sims (Bot. Mag. t. 2673: 1826) figures and describes as *Colchicum crociflorum* a plant of which he says: "This *Colchicum*, which appears to us to be an undescribed species, was raised at the Botanical Garden belonging to the Apothecaries' Company. It was one of a selection of roots of the officinal Colchicum had at the Hall from three different counties, from which, Mr. Anderson informs us, as many different species were produced. The one from which our drawing was taken was supposed to be collected in the neighbourhood of Hertford, but appears to us to be different from the *autumnale* figured in English Botany." The name is retained in *Index Kewensis*, but Mr. Baker (in Journ. Linn. Soc. xvii 428: 1880), who incorrectly attributes it to Anderson, regards it as synonymous with *C. autumnale*, which however the figure scarcely resembles. It is of course entirely distinct from the plants to which the name has been applied by Regel, Boissier, and Schott and Kotschy.—JAMES BRITTEN.

SURREY HELLEBORINES (p. 325). As one who has botanised regularly in the neighbourhood of Leatherhead and Mickleham for more than twenty years, I have read with some surprise Mr. C. E. Britton's note, in which this district is credited with producing three, if not four species of *Helleborine*, exclusive of *H. violacea*. In my recollection Helleborines are to be found in some seven or eight different spots on these downs, or possibly more. In all of them the plant is in limited quantity and fairly uniform, except in one station, where it is usually abundant, often very luxuriant, and very variable in the colour of its flowers, some being entirely green, others tinted with purple or violet, others again reddish or even ochreous. Without attempting any real criticism of the genus, I have at different times examined these flowers and noted their characters, without detecting any tangible differences among them except those of colour; nor have I observed any but vegetative variations in the other organs. The basal hunches of the lip are usually more or less longitudinally plicate-rugose and often coalesce in a central ridge—features which also obtain in *H. violacea*—but it may be doubted whether gradations of this nature, which seem quite distinct from the rugosity of the lip in *H. atrorubens*, can be said to afford specific characters. None of the examples that I have seen show the long lanceolate green leaves and larger flowers with longer lip (resembling those of *H. violacea*) as exhibited in the plant of the sandy districts of West Surrey referred to *H. media*; and I can only regard all that I have met with as belonging to one form of *H. latifolia* in which the basal hunches are not uniformly smooth. They may thus be referred, perhaps, to *H. atroviridis*, but, if so, this plant seems at most a mere variety of *H. latifolia*. The addition of *H. atrorubens* to the Surrey Flora is of great interest, if the plant be not an introduction and the identification be correct. It seems remarkable, however, if this smaller and relatively distinct species really occurs at Leatherhead, that it should have been so long passed over in so well worked a district. I have collected this in the dry rock-clefts of the Great Orme and elsewhere near Llandudno, as well as in Western Switzerland and the Italian Alps; its reddish-brown or mahogany-coloured flowers, with broad, rugose lip and a scent of vanilla, should serve to readily distinguish it when growing. I may add that I have never seen *H. violacea*, which appears a good species, in this particular portion of the Downs, although it grows in several neighbouring localities, both to the east and to the west, in the situations indicated by Mr. Britton.—H. W. PUGSLEY.

EURHYNCHIUM MERIDIONALE AND BAZZANIA PEARSONI. I have met with specimens of these plants—the former in the collection of Mosses and Hepatics of the late Rev. A. Ley, the latter in that of the late W. West, both now at the Birmingham University. *E. meridionale* De Not., Portland, Dorset; coll. W. C. P. Medlycott, Sept. 188...; named by H. Boswell. I sent the specimen to Mr. H. N. Dixon, who confirmed Boswell's naming and expressed himself as much gratified to see an undoubted British specimen, since he had doubted whether the plant was really British (see *Handbook of British Mosses*, ed. 2, 471). *B. Pearsoni* (Steph.) Pears. Ben Atta—S.E. slope—Glencoe, Argyllshire; coll. W. West, Aug. 1907; named by M. B. Slater. This meaning was confirmed by Mr. W. E. Nicholson, to whom I sent the specimen. The plant has hitherto only been met with in Ireland at Killarney and on the Island at Achill. It was evidently growing among other Hepatics and Mosses, and the stems had been picked out of the mass.—E. Cleminshaw.

REVIEWS.

Bref och Skrifvelser af och till Carl von Linné med understöd af Svenska Staten utgifna af Upsala Universitet. Första Afdelningen Del VII. Bref till och från Svenska enskilder personer: Hasselgreen–Kallström. Utgifna och med upplysande noter försedda af Th. M. Fries † och J. M. Hulth. Upsala, 1917. Pp. vi + 192. 8°.

The previous issues of this collection have been duly reviewed in this 'Journal,' the last a year ago (1916, p. 372). The present volume resumes the issue of letters written to or received from Swedes at home or abroad. As the short preface by Dr. Hulth explains, this volume contains all that the late Prof. Th. M. Fries had left prepared for printing. Though it fell short of the usual amount for a volume, the committee entrusted with the publication decided to print it as it stands, being the conclusion of the work of the late editor: but another small volume will be issued, so that when the two are bound in one the bulk will be about the usual amount.

There are five correspondents whose letters are of special interest; the first of these is the ill-fated Fredrik Hasselquist (1722–52). When Queen Louisa Ulrika, upon Abraham Bäck's earnest appeal, purchased the collections of Hasselquist, which were detained at Smyrna for his debts, the whole were put into the hands of Linnæus to print an account of his former pupil's eastern journey. This was done by printing first Hasselquist's diary, next a systematic account of his collections, botanical, zoological, and antiquarian, and finally the letters received at Upsala from Hasselquist himself. The letters now printed show several corrections to the book which came out in 1757 as "Fredric Hasselquists . . . Iter palæstinum eller resa til Heliga landet . . . på Hennes Kongl. Maj:ts befallning, utgifven af Carl Linnæus. Stockholm," 8°. A rapid comparison shows that we here have five, chiefly short, letters, not printed before, and four from Linnæus himself, besides several corrections in spelling and the restoration of certain paragraphs which were omitted in 1757.

The second notable correspondent is Peter Hernquist (1726–1808), well-known as Sweden's first veterinary surgeon; here are thirteen letters, those of early date giving an account of his travels in France, from 1763 to 1769, which were undertaken on the recommendation of Linnæus. On his return to Sweden Hernquist finally succeeded in his effort to set up a veterinary school, of which he became professor and head.

Nine letters are printed from Friherre Carl Hårleman (1700–53) with three from Linnæus; the correspondence shows the close friendship between them. Unfortunately only three of Linnæus's letters to Hårleman have come down to us, though nine are here printed from Hårleman.

The next name which may be mentioned is that of Count A. J. von Höpken (1712–89) who was Chancellor of Upsala University from 1760 to 1764; the letters—two from Linnæus and thirty-two from Höpken—are for the most part short.

The last who calls for special remark is Andreas Kallström (1733?–1812), both of whose letters are dated from Kensington in 1764 and 1765. In order to gain gardening experience, he came to London and obtained employment as a journeyman gardener at Kensington Palace. His letters speak of Philip Miller at Chelsea, packets of seeds for Upsala, and the forthcoming edition—the eighth—of Miller's *Gardeners Dictionary*. Kallström went to Paris from London, and ultimately returned to Sweden, but we have here only this brief lifting of the veil during his stay in London.

B. D. J.

Dutch N.W. New Guinea: a Contribution to the Phytogeography and Flora of the Arfak Mountains, &c. By L. S. Gibbs, F.L.S., F.R.M.S. London: Taylor & Francis, July 1917. Demy 8vo, paper boards, pp. iv, 226, 4 plates, 16 text-figures. Price 12*s.* 6*d.*

This important contribution to our knowledge of the flora of New Guinea is the result of investigations by Miss Gibbs—who had already published in the *Journal of the Linnean Society* the results of her travels in Fiji and North Borneo—in December 1913 into the flora of the Arfak Mountains, to which is appended a list of plants collected by her in the vicinity of Manokoeari, Humboldt Bay, and in three of the islands, in January and February of the following year.

The first fifty pages are occupied with introductory matter, in which is given a summary of previous work—the first collection of plants from the region was made by Lesson in 1824. A section on the general characters of the country is followed by the itinerary and general account of the vegetation; then come plant associations and phytogeographical conclusions. A brief summary of the botanical results is followed by a systematic enumeration of the plants collected, over 330 in number, of which a hundred are new, "with one new natural order and five [four] very distinct new genera." The order is *Trimeniaceæ*, regarded by Perkins and Gilg as a tribe of *Monimiaceæ* but here raised to ordinal rank: it comprises the two anomalous genera *Trimenia* (of which a new species is described) and *Piptocalyx*, to which Miss Gibbs adds a third—*Idenburgia*—with two species. The other new genera are *Gibbsia* (Urticaceæ) with two species, described by Dr. Rendle; *Poikilogyne* Baker f. (Melastomaceæ), also with two; and *Palmervandenbroekia*—a terrible name which might surely have been shortened?—(Araliaceæ), monotypic. Among the more interesting of the new species, many of which are figured are *Dacrydium novo-guineense* Gibbs, *Libocedrus arfakensis* Gibbs

Kentia Gibbsiana Beccari, *Corsia arfakensis* Gibbs, *Pullea papuana* Gibbs, *Elæocarpus koebrensis* Gibbs, *Kissodendron bipinnatum* Gibbs, *Diplycosia Lilianæ* J. J. Smith, *Lobelia arfakensis* Gibbs; "*Patersonia*, *Centrolepis* Gibbs, and *Hibbertia*, represent new generic records for New Guinea," each taking the name *novo-guineensis.* The Orchids number 57 species and varieties, of which 20 and 4 are new; these and the *Ericaceæ* and *Epacridaceæ* have been elaborated by Dr. J. J. Smith of Buitenzorg, to whom Miss Gibbs acknowledges special obligations. Mr. Gepp has undertaken the ferns, describing 7 as new, and Dr. Beccari the palms: in other orders, less numerously represented, Miss Gibbs has also had the help of various botanists.

In the second list, which comprises about 150 species, Mr. Ramsbottom has several new fungi and gives an account of the genus *Dictyophora*; Mr. Gepp has numerous new ferns, including a new genus, *Thysanosoria.* In the grasses, Dr. Rendle describes *Gigantochloa novo-guineensis*: orchids again are numerous, and Dr. Valeton has some new *Rubiaceæ.*

Turning over the pages, one is struck with the great length of some of the descriptions. This is especially noticeable in the *Orchidaceæ*, many of which occupy nearly a page, and in the *Palmæ*, described by Dr. Beccari, where four species have between them seven-and-a-half pages.

The volume is well printed, but the occasional employment of black type—say for the names of the orders—would have rendered the book more easy to consult; and some use might have been made of the page-headings. We note that the spelling "*Shefflera*" is adopted for the genus of *Araliaceæ* usually known as *Schefflera.* Miss Gibbs is to be congratulated on the excellent results of her travels, as well as on the possession of all the qualifications necessary for such laborious undertakings.

Two Books on Grasses.

(1) *British Grasses and their Employment in Agriculture.* By S. F. Armstrong, F.L.S., School of Agriculture, Cambridge University. 8vo, pp. viii, 199; with 175 illustrations. Cambridge University Press, 1917. Price 6*s.* net.

(2) *Grasses of the West Indies.* By A. S. Hitchcock and Agnes Chase. Contributions from the United States National Herbarium. Vol. xviii. part 7. 8vo, pp. xviii & 261–471. Washington, 1917.

(1) Some years ago (in 1901), the Cambridge Press issued a small handbook on Grasses by the late Professor Marshall Ward. It was a handy little introduction to the study of our native grasses, and, in addition to helpful descriptive keys for their determination by means of vegetative, floral or "seed" characters, contained a well-written and useful account of the structure of the various organs and their biology and that of the plant as a whole. Mr. Armstrong's somewhat larger work will not supersede Marshall Ward's admirable little book, though the chapters of the botanical section cover much the same ground. In view of the similarity of treatment the newer

work might have grown out of the earlier one as an adaptation to the needs of the agricultural student, and we expected to find some reference to it in Mr. Armstrong's preface. However, the agricultural student, for whom primarily the volume has been written, will find in it a useful guide to his study of the grasses which form our meadows and pastures, and valuable help in their practical employment and treatment.

The subject-matter is divided into two parts—a botanical section and an agricultural section respectively: the first or botanical part occupies about two-thirds of the whole. The earlier chapters contain a short account of the general structure, biology, and distribution according to soil and position, of British Grasses—though the Maize is selected to illustrate germination. Structural features are briefly explained and illustrated by clear diagrammatic figures. There is no mention of the method of growth of the grass-culm, a description of which might perhaps have accompanied the figure of the base of an internode with its enveloping leaf-sheath. Then follow three keys to the more common species based respectively on foliage, floral (including inflorescence) and "seed" characters, the "seed" being the portion which separates from the parent plant, including the pales. The remainder of the section is taken up with a botanical description of the species, the genera being arranged in alphabetical sequence. The main features are described and there are numerous figures, especially of the "seeds," which help materially in the work of elucidation. The author is not always orthodox in his nomenclature, presumably he uses the more generally recognised names: we note, however, that the False Oat is called *Arrhenatherum avenaceum* in the botanical section but *Avena elatior* in the agricultural. The second section deals with matters of special interest agriculturally. An account is given of the properties, from this point of view, of the useful grasses, and the characters of commercial seed with a description of the usual impurities. The concluding chapters deal with the valuation and purchase of grass seeds, the specification and compounding of grass seed-mixtures (*à propos* of which the author pleads for the production and propagation of races of our own native grasses) and the general treatment of grass-land. An Appendix supplies a list of local, rare or introduced foreign grasses not otherwise described in the book; and there is also a short bibliography.

(2) The Grasses of the West Indies by Mr. A. S. Hitchcock, Systematic Agrostologist of the U.S. Department of Agriculture and the Assistant Agrostologist, Agnes Chase, is a useful bringing together of our knowledge of the grass flora of the West Indian Islands. American botanists and collectors have accumulated a large amount of material from these islands; the catalogue of specimens in the United States National Herbarium, arranged by collectors' names and numbers, occupies nearly seventy pages in the present volume. Among the collectors are included both the authors, who have had the opportunity of studying the species in the field as well as in the herbarium. They have also studied widely the grasses of the New World, and Mr. Hitchcock has had the opportunity of examining the specimens in the Sloane Herbarium at the British Museum and those of Patrick Browne in Linnæus's Herbarium, on which many of the earlier American species are based. The authors are therefore well

equipped for their work and have produced a manual which will be much valued by students of the West Indian Flora.

The descriptive list includes 110 genera and 455 species, of which one genus and 17 species are new. The new genus, *Saugetia*, belongs to the tribe Chlorideæ and is placed next to *Gymnopogon*. It is represented by one species from a single locality in Cuba. A fragmentary specimen had been collected by Wright in the same locality in 1865, and a visit to this by Brother Léon (Joseph Sylvestre Sauget), in whose honour the genus is named, resulted in finding further specimens.

The list supplies keys to the tribes and genera, and, under each genus, to the species. Brief descriptions are given of the genera and species, and synonymy is cited so far as it bears on the West Indian flora.

Owing to the independent views on nomenclature held by a section of American systematists and followed by the authors in this volume, some generic names will be unfamiliar to many botanists, such as *Syntherisma* for *Digitaria*, *Chætochloa* for *Setaria*, *Notholcus* (!) for *Holcus*. We note also that the term lemma is used throughout to express the barren glumes at the base of the spikelet.

A. B. R.

BOOK-NOTES, NEWS, ETC.

MR. W. R. B. OLIVER sends us a copy of his exhaustive study of "The Vegetation and Flora of Lord Howe's Island" (issued July, 1917) reprinted from the *Transactions of the New Zealand Institute* (xlix. 94–161). Beginning with a general description of the island, the author proceeds to a careful synopsis of the plant formations and associations; this is followed by a discussion of the origin of the flora, which contains four endemic genera of vascular plants—*Colmeiroa* (Saxifragaceæ), *Negria* (Gesneraceæ) and two Palms, *Hedyscepe* and *Howea*—and seventy species. Then follows the list of indigenous plants, which includes one new species—*Coprosma prisca*; in this are summarized the previous records, with habitats and distribution and notes on the anatomy of the leaves of some of the species. A good bibliography concludes the paper, which contains numerous illustrations and is in every way an excellent piece of work. We regret however to note that Mr. Oliver employs trinominals—e. g. *Macropiper excelsum psittacorum*, *Elatostemna reticulatum grande*.

THE *Catholic World* (New York) for October contains a memoir of Dr. Edward Lee Greene (1843–1915) which, so far as it deals with his personality, is full of interest, and in this respect supplements the notices which appeared in various American scientific periodicals at the time of his death. From this we learn that his herbarium and library were purchased before his death by the University of Notre Dame, Indiana, and that an official biography is in preparation by the faculty of that University. We hope that those responsible for the undertaking will be better acquainted with matters botanical than was the writer of the memoir in question, who has an amusingly exaggerated estimate of Greene's botanical work. We are told that he "now bears the title of father of systematic botany in the United States," and that "in Europe, among other proud distinctions, he was known as the father of the neo-American school of nomenclature": "a learned botanist of Turin, Italy, wrote sorrowfully after death had claimed this master that the last great American scholar was gone and no others would reach his heights, since no others, in the breathless haste of the age, would perpetuate his methods." The following paragraph, which we transcribe textually, will we think justify our contention that the writer's zeal for Greene's memory is hardly according to (botanical) knowledge:—

"His stern and uncompromising attitude in seeking good Latin names for new species, at least had the effect of discouraging the prevalent American habit, characterized by calling a beautiful flower discovered in the great National Park, *Yellowstoniensis.* It is his distinct triumph, and throws a clear light on his phenomenal talents, that he discovered and published more than five thousand new species to which he gave sonorous classic Latin names. Latin, such as Cicero and Horace used, yet luminously descriptive in every essential of the plant named. No one can look upon a bed of those sprightly blossoms which he discovered and called *viola læte virens* without a reverent appreciation of the master's genius. Other names given in the *viola* family, equally felicitous, are *latiuscula*, *prionosepala septentrionalis* and *nephrophylla.* There are scores of others given to the *delphinium*, *ranunculus*, *senecio*, *rosa* and *antennaria* which he discovered, which have compelled the admiration of the scientific world [!]. A plant made known by him in his early years in the far West is the *eschscholtzia*, the Californian poppy. It lifts a golden cup in millions of gardens today, and for those who know it is one of the enduring monuments to the memory of this gentle naturalist."

THE *Kew Bulletin* issued in October (nos. 4–5) is mainly occupied by a monograph of the Indian and Eastern species of *Strychnos*, by Mr. A. W. Hill. Seventy-seven species, many of which are new, are described, to which are added "species non satis notæ," bringing the number up to ninety-two. The history of the Linnean *S. colubrina* and *S. Nux-vomica* is elaborated at much length; with the latter an allied species, which Mr. Hill describes as *S. Nux-blanda*, has been generally confused. The paper, which includes a number of useful figures from drawings by Miss M. Smith, is an important contribution to our knowledge of the genus.

AT the meeting of the Linnean Society on Nov. 1, a paper on "The Germination of *Iris Pseudacorus* in Normal and Abnormal Conditions" was read by Lieut.-Col. J. H. Tull. He criticized the remarks on the subject made by Mr. T. A. Dymes at the meeting of the Society on Nov. 30, 1916, of which a summary will be found on p. 30 of our present volume, pointing out that the conditions under which the seeds used by Mr. Dymes were expected to germinate were not normal, although his results were correct. The writer's experiments tend to show that the *Iris* produces in mud and shallow water seedlings which are normal and healthy.

IN addition to the paper summarized on p. 334 the last Report of the Winchester School Natural History Society includes a list of additions to the local flora which contains more misprints than we have ever seen in so small a contribution ("Galium nicome" baffles us), and a long paragraph recording aliens—"Quite a new discovery for

Winchester was the Tomato"! The Report affords gratifying evidence that the study of natural history, which seems of late years to have largely disappeared from public schools, still flourishes in at least one of them.

The *Proceedings of the Linnean Society* (Nov. 1916–June 1917) contains, besides the usual obituary notices, a "Cartographic Study of the Southern Element in the British Flora," by Dr. Stapf, whose former paper on "The Southern Element in the British Flora" was published in Engler's *Botanische Jahrbücher*: it is we think to be regretted that papers of such interest to British botanists should appear in places not readily accessible to most of them. The number also contains an account of the origin of the Hooker Lecture—but not the lecture itself, which was delivered by Prof. Bower—and a list of the published portraits of Sir Joseph Dalton Hooker, at whose inception the lecture was founded.

Two important papers on plant diseases have been published in Holland in Meded. Rijks Hoog. Land-, Tain- Bosch-bouwsch. x. & xii. 1916 & 1917, and have been reissued in slightly abridged form in English and French. The first, by H. M. Quanjer assisted by H. A. A. Van der Lek and J. Oortwijn Botjes, deals with phloem necrosis (leaf-root) and related diseases such as the Sereh diseases of sugar-cane. In potato plants affected with this disease the phloem is found to be largely abnormal: the cell-walls are swollen and become a yellowish-brown colour, the necrosis being most marked in the older portions near the groups of bast fibres. The trouble can be traced from the leaf mid-rib to the underground parts of the stem near the seed tuber. No specific organism has been detected as the origin of the necrosis, and it has been referred vaguely to the action of some virus though the author is inclined to think it may be due to some very minute bacillus or even to some protozoon. The whole question is studied in great detail and the paper forms a weighty contribution to the elucidation of an obscure problem. It is illustrated by coloured and photographic plates, some of them stereoscopic, and by figures. The second paper translated into French is by Van der Lek and gives the results of his investigations on *Rhizoctonia violacea*, a fungal disease of beetroot, carrot, &c. The author has proved by observation and culture that the species is not identical with *Rhizoctonia Solani*. He has been the first to succeed in growing pure cultures; in these it grows as a fine white mycelium which later becomes purple; minute sclerotia were formed but no reproductive bodies were observed. The paper is illustrated by photographic plates and by figures.—A. L. S.

The *Naturalist* for November contains notes on the Flora of Ribble-Craven, by J. F. Pickard; a paper on Sphagna by W. Ingham, with notes on their use "in social life"; and a notice, with portrait, of the late Robert Braithwaite.

The *Garden* of Oct. 13 has an article on "Native Blackberries, cultivated," by Mr. J. C. Varty-Smith. He especially recommends *Rubus Koehleri* (misspelt *Kolleri*) which he says is "very productive, early, and bears large fruit." "The writer has the plants growing and hanging down over a high ha-ha wall facing south, a position very suitable, and where the fruit can be easily gathered."

How to Collect and Dry Flowering Plants and Ferns is a neat, cheap (7*d.* n.) and useful little book written by Mr. H. S. Thompson and published by Messrs. Routledge. Mr. Thompson is entitled to give advice on the matter, for like Chaucer's parson, he has "first folowed it himselve" as any one who has had specimens from him will know; and he rightly condemns the distribution of "ill-chosen, misshapen, discoloured and awry" examples, "otherwise valuable," of "critical varieties and forms." Mr. Thompson does not stop at collecting and drying, but tells us how to mount and poison the specimens, how to label them, how to send them by post—in fact his little book contains all that folk need know about preserving plants.

The late Sir George Birdwood, of whom we hope to publish some account in our next issue, had promised to write for the *Journal* a notice of SIR CLEMENTS R. MARKHAM (1830–1916), and for this reason our notice of the latter was deferred. It has now been rendered unnecessary by the volume—*The Life of Sir Clements R. Markham*, K.C.B., F.R.S.—from the pen of Sir Albert H. Markham, which has just been published by Mr. John Murray. A summary of his work in connection with the collection and introduction to cultivation of Cinchona will be found in the volume, in which a special chapter (pp. 164–194)] is devoted to "the quest for Cinchona." He contributed to the first volume of this Journal (1863, pp. 37–55) a paper on "Chinchona Cultivation in India" and wrote in the second (pp. 8–11) on the introduction of Peruvian Cotton to that country: in the former volume (p. 325) Seemann named after him the genus *Markhamia* (now reduced to *Dolichandrone*).

The Report of the Department of Botany, British Museum, mentions the following among the more important accessions to the Herbarium:—Lt. A. Buchanan, specimens from British East Africa; P. Amaury Talbot, from Degema, S. Nigeria; G. L. Bates, from West Tropical Africa; R. A. Dümmer, from Uganda; Capt. C. Tristram, Himalayas; Director, Botanic Gardens, Singapore, from Malay Peninsula; Capt. W. H. Shakespear, from Arabia; Dr. F. Stoward and J. E. C. Maryon, from West Australia; Dr. R. R. Gates, 135 specimens of cultivated *Œnothera*; P. A. Saccardo "Mycotheca Veneta"; J. Groves, European Characeæ; Torquay Natural History Society, Muscineæ from the East Indies and North America; Dr. C. W. Andrews, Cryptogams from Christmas Island; Mrs. Cara Shinn, Fungi from Nyasaland; Miss A. Pegler, Cryptogams from Kentani, South Africa.

By exchange of duplicates there have been acquired: from the Regius Keeper, Royal Botanic Gardens, Edinburgh, species of *Primula* from Yunnan, W. China; Director, South African Museum, Cape Town, Ericaceæ and Leguminosæ; Curator, Auckland Museum, New Zealand plants; Prince Bonaparte, Mexican plants; Department of Agriculture, Washington, U.S.A., North American Grasses; U.S. National Museum, Washington, Tropical African (Col. Theo. Roosevelt Expedition, 1909–10), Argentine and North American plants; Director, Botanic Gardens, New York, Jamaica plants; Director, Museu Goeldi, Para, Brazilian plants.

We regret to announce the death of two veteran botanists:—Dr. Robert Braithwaite (born 1824) who died at Brixton on Oct. 20 and Mr. Worthington George Smith (born 1835) who died at Dunstable on Oct. 27. Notices of both will appear in an early issue.

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CORRIGENDA.

P. 47, l. 4 from bottom, for "*insititia* L." read *cerasifera* Ehrh.
P. 23, l. 23 from top, for "235" read 285.
P. 28, l. 2 from top, for "flavour" read flavon.
P. 53, l. 18 from bottom, for "1805" read 1806.
P. 55, l. 10 from top, for "lawns" read humus.
P. 62, l. 6 from bottom, for "Balbon" read Bolton.
P. 89, title, for "1917" read 1916.
P. 196, l. 18 from top, for "shells" read cells; l. 20 for "in." read μ.

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BRITISH EUPHRASIÆ.

By CEDRIC BUCKNALL, Mus. Bac. Oxon.

Since the appearance of Wettstein's Monograph (1893) and of Townsend's account of the British species of *Euphrasia* (Journ. Bot. 1897), many able botanists have interested themselves in the genus, and by collecting specimens from all parts of the British Isles have greatly extended our knowledge of the distribution of these plants, besides adding four species, one of them new, to the British Flora. Many of the forms are well marked and as a rule are correctly named by collectors, but with others a wide diversity of opinion as to names and position has clearly shown that in estimating the value of distinctive characters and in perception of the limits of variation we still have much to learn.

During the past twenty years I have collected examples of nearly all the species described by Townsend in his Monograph, and have examined a large number of British specimens contained in herbaria; while visits to Switzerland, Tyrol, North Italy, and parts of France have made me acquainted also with a number of Continental forms. Led by this experience I have arrived at the conclusion that, if closer attention were paid to the general habit and more obvious characters of these plants, their study would be much facilitated, and their position could be determined with greater certainty. A preliminary attempt in this direction is made in the analytical keys and in the short diagnoses which follow, and in these more prominence is given to certain characters than is apparent in the minute and elaborate descriptions of Wettstein and Townsend, without, I believe, introducing anything that is at variance with the descriptions or figures of those authors.

The characters of which I propose to make use are:—1. The relative density or laxity of the entire plant, depending on the length of the internodes between the cauline leaves and the branches, and between the bracts of the fruiting-spike. 2. The relative length of the leaves and bracts in the same plant, and their actual length in different species. 3. The length of the fruiting-spike in relation to the entire stem, and whether it is stout or slender. 4. The shape of the teeth of the fully developed upper bracts, viz. those of the younger fruit or of the older flowers. This varies from triangular or ovate to lanceolate and subulate and is often characteristic of the species. In some cases, however, the shape of the teeth is variable, and too much reliance should not be placed on it as a distinguishing mark. In Wettstein's diagrams of the leaves and bracts this diversity of form is not shown with sufficient clearness, as may be seen by the examination of the actual plants.

The length of the corolla is variable. and is unreliable as a distinctive character, at least in the British species. For example, *E. Kerneri* belonging to the *Grandifloræ*, sometimes occurs with small flowers, especially at the end of the flowering, and in these the lengthening of the corolla-tube is scarcely apparent. Again, *E. latifolia* normally with the corolla 6 mm. long, has a variety *grandiflora* Wetts., with the corolla twice this length. Moreover, the conspicuousness of the flower is not dependent on the length of the corolla "measured along the back," but on the breadth of its lips; so that a flower may be larger and more conspicuous than its length as given in millimetres would indicate. For this reason and because the measurement of the corolla in the dried state is difficult and uncertain, the flower is, as a rule, in this paper, only described as large, small or conspicuous.

The leaves in simple specimens of any species are usually persistent during the flowering, but in branched plants they are deciduous. This is therefore seldom of much value as a specific character.

The student should be reminded that it is of little use to attempt to name immature, damaged or poor specimens, or those which are past flowering, until he is well acquainted with the species in all its stages.

After the diagnosis of each species there follow examples of plants from different British localities. These serve as records of stations for typical plants as well as for variations from the type; in some cases they are of plants which have been distributed, in my opinion, under incorrect names.

Of my own gathering, all the Scotch and some of the English specimens were named or confirmed by Mr. Townsend, and I have been greatly assisted in my studies by the kindness of Mr. Charles Bayley and Mr. G. Claridge Druce, who have placed their valuable collections of *Euphrasia* containing many authentically named examples, at my disposal.

The analytical keys which follow apply only to the normal well-developed form of each species and its principal named varieties. Some of the intermediate forms and deviations from the type are mentioned in the lists of specimens which I have examined. The measurements of the corolla given in the keys of the *Parvifloræ* and *Grandifloræ* are those of Wettstein, but, as already stated, these measurements do not always apply to British plants.

KEY TO THE BRITISH SPECIES.

Upper cauline leaves, excluding the few patent teeth at least twice as long as broad; capsule glabrous or with a few decumbent hairs on the margin .... 19. *E. salisburgensis.*

Upper cauline leaves at most twice as long as broad; capsule with erect hairs on the margin .... 1.

1.	Corolla large, 10–15 mm. long	2.
—	Corolla smaller, but plant with long glandular hairs	22.
—	Corolla small, 4–10 mm. long	4.
2.	Corolla-tube not elongating at the end of the flowering	3.
—	Corolla-tube elongating at the end of the flowering; corolla brightly coloured	21.
3.	Bracts with short, straight glandular hairs	8. *E. brevipila* f. *grandiflora*.
—	Bracts eglandular (in the British plant), foliage densely hairy	6. *E. latifolia* f. *grandiflora*.
4.	Fruiting-spike ± stout, dense, or, if lax, long and occupying the greater part of the stem; stem simple or branched at or below the middle; bracts usually large	5.
—	Fruiting-spike more slender, lax, rarely dense; stem branching higher; internodes long, rarely short	14.
5.	Fruiting-spike occupying the greater part of the stem or at least half its length	6.
—	Fruiting-spike shorter, seldom exceeding half the length of the stem	10.
6.	Bracts eglandular	7.
—	Bracts glandular	9.
7.	Teeth of upper bracts ovate or triangular, subobtuse; foliage coriaceous, dark green	2. *E. borealis*.
—	Teeth of upper bracts lanceolate or subulate, acute	8.
8.	Stem usually 10–20 cm. high, teeth of upper bracts subulate, aristate; foliage green	1. *E. stricta*.
—	Stem seldom exceeding 10 cm., much branched or nearly simple, teeth of upper bracts lanceolate, acute or subaristate; foliage hairy	4. *E. curta*.
	Foliage less hairy	*E. curta* var. *glabrescens*.
9.	Stem 4–8 cm. high with few or many branches; fruiting-spike rather stout; glandular hairs not numerous	3. *E. occidentalis*.
	Plant small, 1–2 cm. high and broad, rarely more; glandular hairs sometimes very few; flowering early	*E. occidentalis* var. *præcox*.
—	Stem 5–25 cm. high, simple or with a few branches; flowers larger, usually violet; glandular hairs very numerous	10. *E. Vigursii*.
	Foliage pale green; bracts with narrower more acute teeth; flowers lilac and white	*E. Vigursii* var. *pallens*.
10.	Bracts large, with short glandular hairs; stem 10–30 cm. high, lower internodes long	8. *E. brevipila*.
—	Bracts without glandular hairs	11.
11.	Stem tall, 10–25 cm. or more high, internodes very long	12.

— Stem short, 3–10 cm. high, lower leaves broad with a very obtuse terminal tooth which is broader than long .... 13.

12. Stem pale brown, simple or with a few branches above the middle, and occasionally with 1–2 rudimentary ones below it.............. 9. *E. suecica.*

— Stem branched lower, branches usually more numerous, longer and stouter, internodes not so long .... *E. brevipila* var. [*subeglandulosa.*

13. Foliage very hairy, hairs of stem long .... 6. *E. latifolia.*

— Foliage nearly glabrous .... 7. *E. foulaensis.*

14. Stem normally much branched, tall, branches often compound, internodes usually long; leaves at the base of the principal branches patent or deflexed, longer than the bracts... 15.

— Stem simple or with a few, rarely many, branches; leaves and bracts small........... 16.

15. Eglandular; foliage glabrous .... 11. *E. nemorosa.*

Foliage sparingly setulose .... *E. nemorosa* [var. *ciliata.*

Stem shorter with short internodes .... *E. nemorosa* [f. *compacta.*

(Compare subglabrous forms of *E. curta* approaching *E. nemorosa.*)

— Glandular .... 12. *E. campestris.*

16. Stem 5–20 cm. high, internodes usually long, bracts with acute teeth .... 17.

— Stem 3–6 cm. high, rarely more, internodes usually short; leaves and bracts very small, with 1–3 obtuse teeth on each side .... 19.

17. Corolla rather large and conspicuous, violet; flowers and leaves few; leaves and bracts larger than in *E. gracilis*, often patent; stem simple or slightly branched above...... [5. *E. cærulea.*]

— Corolla small, dark violet or lilac and white; flowers and leaves more numerous; leaves and bracts smaller .... 18.

18. Stem wiry, slender, dark purple, simple or with a few, rarely many, erect branches about the middle; corolla small, often dark violet; leaves and bracts small, often nigrescent .... 13. *E. gracilis.*

Corolla larger, blue .... *E. gracilis* [var. *primaria.*

— Stem paler, simple or with 1 or 2 branches, rarely more; corolla white or lilac and white; foliage greener; bracts usually larger; flowering spike broader at the top. (Compare mountain forms of *E. curta* with long internodes.)................................. 14. *E. scotica.*

19. Corolla yellow or violet and yellow .... 15. *E. minima.*

Corolla white or lilac and white .... 20.

20.	Stem simple, 3–6 cm. high, internodes of fruiting-spike long or short	*E. minima* [var. *nana*.
—	Stem 2–5 cm. high, much branched, branches often compound	*E. minima* [var. *arbuscula*.
21.	Eglandular; stem with many, rarely few branches; leaves and bracts small, nearly glabrous	16. *E. Kerneri*.
—	Glandular; gland-tipped hairs long and flexuous; leaves and bracts larger, setulose	22.
22.	Stem with a few branches and long internodes; spike relatively short; flowers usually large	17. *E. Rostko*- [*viana*.
—	Stem simple or nearly so; spike occupying the greater part of the stem; flowers smaller	18. *E. fennica*.

ALTERNATIVE KEY.

	Bracts eglandular	1.
	Bracts glandular	17.
1.	Upper cauline leaves, excluding the few patent teeth, at least twice as long as broad; capsule glabrous or with a few decumbent hairs on the margin	19. *E. salisburg*- [*ensis*.
—	Upper cauline leaves at most twice as long as broad; capsule with erect hairs on the margin	2.
2.	Corolla large, 10–15 mm. long	3.
—	Corolla smaller, 4–10 mm. long	4.
3.	Corolla-tube elongating at the end of the flowering; stem usually much branched; bracts small, 5–6 mm. long	16. *E. Kerneri*. [f. *grandiflora*.
—	Corolla-tube not elongating; plant very hairy, bracts 7–8 mm. long	6. *E. latifolia*
4.	Bracts 7–11 mm. long; fruiting-spike stout	5.
—	Bracts 3–8 mm. long; fruiting-spike more or less slender	10.
5.	Bracts 8–11 mm. long, stem tall with long internodes	6.
—	Bracts 7–9 mm. long; stem usually shorter, with short internodes	7.
6.	Stem pale brown, simple or with a few branches above the middle and occasionally with 1–2 rudimentary ones below it, internodes very long	9. *E. suecica*.
—	Stem branched lower, branches usually more numerous, longer and stouter, internodes not so long	*E. brevipila* var. [*subeglandulosa*.
7.	Fruiting-spike long in proportion to the stem	8.

— Fruiting-spike short in proportion to the stem; terminal tooth of lower leaves very obtuse, broader than long .... 9.

8. Fruiting-spike very dense; teeth of upper bracts broad, ovate; leaves and bracts dark green, thick in texture .... 2. *E. borealis.*

— Fruiting-spike less dense; teeth of upper bracts lanceolate or subulate, acute, aristate; leaves and bracts thinner and greener ...... 1. *E. stricta.*

9. Plant densely hairy with long hairs .... 6. *E. latifolia.*

— Plant nearly glabrous .... 7. *E. foulaensis.*

10. Foliage hairy; plant usually short, much branched from the base or nearly simple; internodes short .... 4. *E. curta.*

Foliage less hairy .... *E. curta* var. *glabrescens.*

— Foliage glabrous or minutely setulose .... 11.

11. Stem ± tall, internodes usually long; teeth of upper leaves and bracts acute .... 12.

— Stem 3–6 cm. high, rarely more, internodes usually short; leaves and often bracts with obtuse teeth.. 15.

12. Branches typically numerous, often compound; leaves at the base of the branches longer than the bracts, spreading or deflexed; internodes long .... 11. *E. nemorosa.*

Internodes short .... *E. nemorosa* f. *compacta.*

Leaves and bracts setulose. (Compare subglabrous forms of *E. curta* approaching *E. nemorosa.*) .... *E. nemorosa* var. *ciliata.*

— Branches none or few, rarely many .... 13.

13. Corolla conspicuous, violet; leaves and bracts few, larger than in *E. scotica*, patent, stem simple or slightly branched above .... [5. *E. cærulea.*]

— Corolla small, violet or lilac and white; leaves and bracts smaller and more numerous ...... 14.

14. Stem wiry, dark purple, simple or with a few, rarely many, erect branches about the middle, corolla often dark violet; leaves and bracts small, often nigrescent .... 13. *E. gracilis.*

Corolla larger, blue .... *E. gracilis* var. *primaria.*

— Stem usually paler, simple or with 1 or 2 branches, rarely more; corolla white or lilac and white; foliage greener; bracts usually larger; flowering-spike broader at the top, appearing subcapitate .... 14. *E. scotica.*
(Compare mountain forms of *E. curta* with long internodes.)

15. Flowers yellow or yellow and violet; stem simple or with few branches .... 15. *E. minima.*

— Flowers white or lilac and white .... 16.

16.	Stem simple, internodes of fruiting-spike long or short	*E. minima* var. *nana.*
—	Stem with numerous, often compound, spreading erect branches	*E. minima* var. *arbuscula.*
17.	Glandular hairs long and flexuous	18.
—	Glandular hairs short and straight	19.
18.	Stem branched above or below the middle; internodes long; flowers typically large	16. *E. Rostkoviana.*
—	Stem simple or slightly branched at the base; flowers smaller	17. *E. fennica.*
19.	Stem short, up to 8 cm. high, more or less compactly and strongly branched; internodes short; fruiting-spike dense; densely hairy or glabrescent	3. *E. occidentalis.*
	Plant small, 1–2 cm. high and broad, rarely more, very compact; glandular hairs fairly numerous or very few, setæ minute and inconspicuous; flowering early	*E. occidentalis* var. *præcox.*
—	Stem taller, not compactly branched	20.
20.	Leaves and bracts usually large; spike broad; branches few, internodes long	8. *E. brevipila.*
—	Leaves (except those at the base of the branches) and bracts smaller, spike more slender	21.
21.	Stem often much branched, branches often compound, internodes long; habit of *E. nemorosa*	12. *E. campestris.*
—	Stem simple or with few branches; spike dense, occupying about half the length of the stem, densely glandular; teeth of upper bracts ovate or lanceolate, acute; flowers usually violet	10. *E. Vigursii.*
	Plant pale green; teeth of upper bracts lanceolate or subulate, often aristate; flowers lilac or white and lilac	*E. Vigursii* var. *pallens.*

1. E. STRICTA Host. Stem simple or branched below, branches erect, often nearly as long as the stem, or shorter and spreading. Spikes ± stout, occupying the greater part of the stem and branches; internodes longer than the bracts below, usually shorter and hidden by them above. Leaves and bracts 8–9 mm. long; upper bracts with lanceolate or subulate, acute, aristate teeth. Setæ none or fairly numerous on the margins of the leaves and bracts and on the calyx. Wetts. Mon. t. vii. figs. 5, 6; Towns. Mon. t. 374.

Distinguished from *E. borealis* by its paler green colour, and by the narrow teeth of the bracts; but forms occur which approach *E. borealis*.

At the time of the publication of his monograph, Townsend had not met with British specimens of *E. stricta*, and subsequently suggested that name, but with doubt, for plants with erect branches and leaves which in other respects resembled *E. nemorosa*.

Having now met with plants in several localities that are near to, if not identical with, Continental forms, I am of opinion that many of the supposed British specimens, and also many of those referred by Scandinavian botanists to *E. stricta*, are in reality forms of *E. nemorosa*.

ENGLAND.—N. SOMERSET. Grassy hill-side above Weston-in-Gordano, Sept. 1915.—Peatmoor, Edington, Sept. 1902. Stem with few or many erect branches, leaves and flowers smaller, internodes short but visible nearly to the top of the spike, margin of leaves and bracts rough with short scattered bristles.—Grassy lane below Rowberrow, Sept. 1907. Tall, with large spreading bracts, the teeth of the upper ones ovate to lanceolate, foliage thicker and darker. In these characters it approaches *E. borealis*. W. SOMERSET. Rough ground between Minehead and Porlock in great abundance. Similar to the last but rough with minute scattered bristles. Of this Mr. James Groves, having previously expressed the opinion that British plants seemed nearer to *E. nemorosa*, wrote, "far more like the Continental plant than any we possess."—CAMBRIDGE. Chalk-pit between Haslingfield and Barrington, Aug. 1912, *G. Goode*. Stem simple or with a few short branches at the base, internodes rather long except at the top. Named *E. nemorosa* by me in Wats. Bot. Exc. Club. Rep., but I am now of opinion that it is *E. stricta*.—W. GLOUCESTER. On a scree in the Gully, Durdham Down, Bristol, Sept. 1915. Young plants were observed during the summer of 1916 when the internodes of the flowering-spike were found to be longer than in the mature plants. These were full-grown and typical on July 27th.—N. LANCASTER. On the coast south of Grange-over-Sands, Aug. 1915.

IRELAND.—GALWAY. Very abundant near the lake, and on Urrisbeg, Roundstone, Aug. 1907. Varying greatly in size and in the density of the spike; flowers larger and more conspicuous than in English plants.—Dogs' Bay, Roundstone. *G. C. Druce*, det. *C. Lindman*, 1911. Also with *E. salisburgensis* in the same locality, Aug. 1907, *C. Bucknall*. Flowers large, violet.—Clifden, Aug. 1907. Some of these have a more slender stem, smaller leaves and flowers, and capsules sometimes exceeding the calyx. These are probably *E. gracilis* × *E. stricta*.—Rossmore, Aug. 1907.

2. E. BOREALIS Towns. Stem simple or branched below; branches spreading-erect, often nearly as long as the stem. Spikes very stout, occupying the greater part of the stem and branches, internodes very short and covered by the closely imbricated bracts. Leaves and bracts 7-9 mm. long, thick and coriaceous in texture, dark green. Upper bracts with ovate or triangular, rarely lanceolate, subobtuse or acute teeth. Setæ none or a few very short ones on the margins of leaves, bracts and calyx-teeth; or in var. *pubescens* Towns. longer and more numerous. Wetts. Mon. t. xi. fig. 7, slender and not typical; Towns. Mon. t. 374.

ENGLAND.—DEVON. Berry Head, Brixham, July 1916, *Mrs. Wedgwood*. This gathering consists of a series of peculiar forms, some typical, some with longer internodes than usual, and others with smaller bracts with narrower teeth, and slender spikes. All are more or less stained, especially the more slender specimens with dark indigo or purple. In some respects these approach *E. stricta.*—N. SOMERSET. Rough pasture above Cheddar Gorge, Aug 7th, 1907. Very characteristic and typical, 11 cm. high. Also gathered and so named by Mr. C. E. Salmon, Aug. 17th, 1907. A small form gathered in Cheddar Gorge, July 1914, has probably been taken for *E. curta*, but it is quite glabrous and has the broadly-toothed bracts of *E. borealis.*—Rough pasture, Failand, near Bristol, July 1906 and 1916. Stem 4–5 cm. high with 2 or 3 short branches at the base, spike 4-sided when fresh. This is perhaps *F. nemorosa* var. *tetraquetra* Bréb., Wetts. Mon. p. 126 as var. *tetraquetra* Arrond. See also Rouy, Fl. de France, xi. p. 153, where it, *E. curta*, and *E. occidentalis*, are placed together as varieties of *E. nemorosa.*—Brean Down, June 1899 and 1916. Small branched plants already in fruit at this date. Townsend considered that this was an abnormal form, possibly of *E. nemorosa*, but the compact growth and broad teeth of the bracts are characteristic of *E. borealis.* It grew in company with the vernal form of *E. occidentalis*, from which it was with difficulty distinguished, except by the absence of glands.—Between Cadbury Camp and Clevedon, Aug. 1916. On the same range of hills as the Failand plant, but taller, more branched, and bracts with narrower teeth.—W. GLOUCESTER. St. Vincent's Rocks, Bristol, July 1902. A small form sometimes approaching *E. stricta.*—MERIONETH. Harlech Golf Links, Aug. 1915, *W. C. Barton.* Similar to the last.

SCOTLAND.—ARGYLE. On the seacoast, Oban, Aug. 1899. Of this Townsend wrote, "Confer *E. borealis* Towns." It appears to me, however, to be quite typical, and is very like the Cheddar plant. A similar plant from Maiden Island, Oban Bay, was named by Townsend *E. curta* var. *glabrescens.* The teeth of the upper bracts are somewhat narrower, but the leaves are quite glabrous, and it must, I think, be referred to *E. borealis.*

IRELAND.—CORK. On the coast, Dunboy, Aug. 1908. A slender form with long internodes below, up to 15 cm. high, simple or with 1–3 spreading branches. The simple specimens have distant, persistent lower leaves as in *E. gracilis*, but the fruiting-spikes are those of *E. borealis.*—GALWAY. On a roadside bank, Recess, Aug. 1902. Similar to the last, but the spike more slender and the bracts smaller.

3. E. OCCIDENTALIS Wetts. Plant often compact and bushy. Stem short, stout, branched from the base or simple; branches often nearly as long as the stem, compound in large specimens. Spikes rather stout with imbricated bracts. Leaves 7–8 mm. long. Bracts 5–6 mm. long, the upper with ovate, triangular or lanceolate, acute teeth. Corolla small, white, lilac or violet. Glandular hairs short, more or less numerous on leaves, bracts and calyx; simple hairs, long or short, numerous or nearly absent. Wetts. Mon. t. xi. fig. 13; Towns. Mon. t. 375. Both of these figures are taken from poorly-developed specimens.

ENGLAND.—E. CORNWALL. Port Quin, near St. Minver, Sept. 1906. —On the downs, Bude, Aug. 1896, *S. T. Dunn*; unnamed.—S. DEVON. Sandy coast near Bigbury, June 1894, *E. S. Marshall*; unnamed; subsequently referred by Wettstein to *E. occidentalis.*—N. SOMERSET.

St. Thomas's Head near Kewstoke, July 1907.—Cheddar, June 1906. Stem 3 cm. high, simple or with 1–2 branches; glands very few. This might easily be taken for *E. curta.*—DORSET. Grassy slopes on the coast, Swanage, July 1903. Strong compact plants with stout stem about 8 cm. high, and stout compound branches; hairs long and numerous, many of them gland-tipped.—Sea cliffs, the Winspit, Worth Matravers, June 1916, *I. M. Roper.* Stem 4–8 cm. high, sometimes much longer than the branches, or simple.—I. WIGHT. Open down near Hoy's Monument, Whitwell, 600–700 ft., Aug. 1916.—On the coast, Steephill Cove, Aug. 1916. Stem 9 cm. high, with long fruiting-spike and a few short branches.

SCOTLAND.—HADDINGTON. Marshy places amongst the sand-dunes, Aberlady, May 1911, *McTaggart Cowan.* Referred by me to *E. curta*, but the presence of glandular hairs and the compact habit leave no doubt that it is *E. occidentalis.*

ORKNEY. Heathery pasture, 90 ft. above sea-level, Black Crag, Stromness, Mainland, Aug. 1912, *H. H. Johnston*, as *E. curta* var. *glabrescens*; *E. borealis*, *fide* E.S.M. "Not *E. curta*" C. H. Ostenfeld. "Corolla pale purple or whitish-purple, with dark purple lines and a yellow spot on throat of lower lip" (B.E.C., corrections in Report for 1912). It is here stated that Mr. Marshall's final opinion was that all the specimens came under *E. borealis* and some of them under the var. *pubescens* Towns. Now all the specimens on this sheet are glandular, as was pointed out by Mr. D. Lumb in a letter to Mr. Druce, and they are in all respects similar to southern *E. occidentalis* except that the flowers are larger—8 mm. long. This plant appears to be distinct from *E. latifolia*, but the question arises as to whether the glandular form of the latter may not be allied to *E. occidentalis.*

Var. PRÆCOX, var. nov. Plant small, compact, 1–2 cm. high and broad. Stem branched, internodes very short, so that the stem and branches are often hidden by the leaves and bracts. Corolla small, white, lilac or violet. Stalked glands more or less numerous; setæ minute and inconspicuous on leaves, bracts and calyx.

Planta nana compacta, 1–2 cm. alta et lata. Caulis ramosus, internodiis brevissimis itaque caulis et rami foliis bracteisque celati sunt. Corolla parva, alba, lilacina vel violacea. Folia, bracteæ et calyces, vel solum bracteæ, pilis glanduliferis plus minus numerosis et setis minimis sparsim obsiti.

ENGLAND.—E. CORNWALL. On the coast, Polzeath, May 18th, 1916, *J. W. White.* Plants 2 cm. high and broad, with full-sized leaves and well-developed fruit; flowers white or lilac. Also on the Spire bank, Rock near St. Minver, with stem 1 cm. high, and violet flowers.—N. SOMERSET. Brean Down, July 1911 and June 1916. Similar to the Cornish plants but stem up to 4 cm. high, not so compactly branched; glands very few, best seen in the fresh plant on the upper surface of the spreading bracts.—Purn Hill, Bleadon, May 1916. Like the Cornish plants, 1 cm. high. In the Somerset localities plants occur on which no glands can be detected except on the corolla.

The question therefore arises as to whether these are eglandular *E. occidentalis* or small forms of *E. borealis*.

4. E. CURTA Fries. Stem generally short, stout, with few or many branches below the middle, internodes short or in some mountain forms long; branches spreading or ascending, sometimes compound. Spikes rather stout, occupying the greater part of the stem and branches, internodes short, generally hidden by the bracts. Leaves and bracts 5–7 mm. long, the upper bracts with triangular or lanceolate subobtuse or acute and apiculate teeth. Hairs long and numerous or, in var. *glabrescens*, short or minute and few.

Fries's description is, "*E. officinalis*, β. *montana*, γ. *curta* pyramidata, ramosissima, foliis squarrosis, floribus exiguis amethystinis." Fr. Novit. Flor. Suec. ed. 2, p. 198 (1828).

Wettstein describes the stem of *E. curta* as "thick, rarely thin, generally branched below as far as the middle." He also refers to slender and only slightly branched forms, and his figure, Mon. t. 7. fig. 11, of an original specimen, represents a slender plant 7·5 cm. high, with a pair of branches at the middle. Townsend's figure, Mon. t. 375, represents a plant from Moidart, with two or three branches nearly from the base. Many diverse forms have been referred to *E. curta* and its variety *glabrescens* which are, in my opinion, more or less hairy or even glabrous forms of other species. Some of these are noticed under the species to which I believe them to belong. My experience is that *E. curta*, as described by Fries and Wettstein, is much less common in this country than *E. nemorosa*.

ENGLAND.—SOMERSET. On turf behind the sand-hills, Berrow, July 1915. Stem not exceeding 11 cm. high, more or less branched. Spike with short internodes, stout or slender; teeth of the upper bracts ovate to lanceolate; leaves and bracts very sparingly setulose. A small glabrous specimen from this neighbourhood was referred with doubt by Townsend to *E. curta* var. *glabrescens*. The present gathering consists of forms some of which approach *E. curta* and others *E. nemorosa*.—DORSET. Middlebere Heath, Corfe Castle, June 1916, *I. M. Roper*. Plants about 6 cm. high and broad; leaves and bracts thinly setulose. Characteristic examples of var. *glabrescens*.—DENBIGH. Great Ormes Head, Llandudno, Aug. 1916, *Mrs. Wedgwood*. This is a peculiar form with many compound branches from the base to the middle, and, in consequence, the larger plants resemble in habit *E. nemorosa*. The leaves, bracts, and calyx-teeth are stained with purplish black on the margins and are minutely and sparingly setulose; the flowers are small, and vary in colour from dark violet with an orange spot to lilac and white or entirely white. I place these plants here with considerable hesitation.—W. LANCASTER. On flat sandy places between St. Anne's-on-the-Sea and the lake at Fairhaven, Aug. 1902, *C. Bailey*. Stem stout, up to 8 cm. high, plant densely hairy, principal cauline leaves sometimes longer than the bracts.—St. Anne's-on-the-Sea, Aug. 1897. The same as the last, but taller.—Sea-embankment, Fairhaven, Aug. 1901. Similar to the last, but with broader, less hairy spikes. Mr. Bailey's gatherings on this coast are much more distinct and characteristic than many of the forms referred to *E. curta*, and, in my opinion, may be regarded as typical of that species. Nevertheless, some of the specimens show, in the less hairy foliage and laxer habit, an approach to *E. nemorosa*. Similar plants from Ansdell, Aug. 1914, were distributed by the Rev. E. S. Marshall (W.B.E.C.).—WESTMORLAND. On Helvellyn, between the Red Tarn and the summit, c. 2500 ft. Stem 5 cm. high, with a few slender branches about the middle; internodes longer than the leaves; spike broad, lower internode about as long as the bract; leaves small in the specimens seen, about 7 mm. long, more or less densely clothed, as well as the coriaceous bracts, with long hairs; bracts large, 9 mm. long, with ovate or lanceolate subobtuse teeth; flowers small, white; capsules large, longer than the calyx-teeth. This appears to form a transition to *E. latifolia*, to which it is similar in habit, but is less hairy.

SCOTLAND.—PERTH. Ben Laiogh, Aug. 1899, *fide* F. T. Weak forms up to 16 cm. high, simple or with one or two branches and long internodes; hairs long, fairly numerous. Also more compact forms with shorter hairs, named *E. curta* var. *glabrescens* by Townsend.—Cruach Ardran, Crianlarich, Aug. 1899.—Near Tyndrum, Aug. 1899. Var. *glabrescens*, *fide* F. T.—ARGYLE. Craig Ghorm, Ballachulish, Aug. 1899. Rather densely hairy. *E. curta*, *fide* F. T.—Maiden Island. Oban Bay, Aug. 1899. *E. curta* var *glabrescens*, *fide* F. T.—Allt a Bhalaich, Kingshouse, Aug. 1899. *E. curta* var. *glabrescens*, *fide* F. T.

IRELAND.—GALWAY. Urrisbeg, Roundstone, Aug. 1902. Typical *E. curta* was not seen here, but plants which appear to be *E. curta* × *gracilis*. See under *E. gracilis*.

[**5.** E. CÆRULEA Tausch. Stem simple, rarely with one or two branches at or above the middle; internodes long. Spike with few flowers, when in fruit occupying about half the stem; internodes long. Leaves opposite, 5–7 mm. long, the lower cuneate or obovate-cuneate, obtuse with 1–3 obtuse teeth on each side, upper and middle ovate or ovate-oblong, broadest towards the base or middle, with 3–5 non-aristate teeth on each side. Bracts 5–7 mm. long, subopposite, similar to the leaves but broader; teeth more acute, not aristate, all green or nigrescent towards the top of the stem, usually plicato-striate below. Corolla 5–7 mm. long, violet. Capsule shorter than the calyx-teeth. Setæ minute, scattered, on leaves, bracts and calyx; a few glandular hairs occasionally on calyx. Wetts. Mon. p. 115, t. vii. fig. 9.]

? ORKNEY. Damp pasture on hill-side, 300 feet above sea-level, Wart Hill, Hoy, Aug. 15th, 1912, *H. H. Johnston*. "Corolla lilac, with dark purple lines and a yellow spot on throat of lower lip." As *E. curta* var. *glabrescens* Wetts. "I think this is a form of *E. curta* var. *glabrescens* with handsome violet-blue flowers." E.S.M. "?" *C. H. Ostenfeld*. (B.E.C.)

The Orkney plant is so near to *E. cærulea* that it is extremely probable that it will prove to be identical if looked for earlier in the season, and it is therefore permissible to give the description of *E. cærulea* as a provisional British species. Wettstein associates it with *E. curta*—the one as a "summer species" and the other as an "autumnal species" (see Wetts. Mon. pp. 43 and 117, and Towns. Mon. p. 7)—and states that *E. cærulea* differs in the simple or only slightly-branched stem with the branches at or above the middle, the violet flowers, the less hairy leaves and bracts, and in the early flowering. In all these particulars except the last the Orkney plants agree. Having, by the kindness of Mr. Charles Bailey, compared the plants with specimens in his herbarium from Bohemia, Silesia and Brandenburg, the only difference I can detect lies in the more numerous and less widely-spaced leaves and bracts. Wettstein states that the flowering season is from May to July, and those I have examined are dated June and July, some bearing fully-formed fruit. The Orkney plant, gathered on Aug. 15th, still bears flowers in good condition, but the fruiting-spike is longer and more advanced than in the Continental examples.

E. cærulea is recorded from isolated areas in Central Europe from Bohemia to Silesia and Pomerania, the latter station being on the Baltic, about 700 miles distant from the Orkneys.

6. E. LATIFOLIA Pursh. Stem simple or with a few branches at or below the middle, stout; internodes long. Fruiting-spike very broad with short internodes, which are hidden by the bracts. Leaves obovate with cuneate base, or broadly ovate with an obtuse terminal tooth which is broader than long, and 1–4 triangular or ovate, obtuse teeth on each side, the largest 8–11 mm. long. Upper bracts closely imbricate with many, up to 7, triangular or lanceolate, subobtuse or acute teeth on each side, 7–8 mm. long. Corolla 5–7 mm., or in f. *grandiflora* 12 mm. long, pale or dark violet. Capsule exceeding calyx-teeth. Hairs long, flexuous, white on the stem, especially below the nodes, on leaves, bracts, and calyx long and dense, or occasionally shorter and scattered. Wetts. Mon. t. xi. fig. 13; Towns. Mon. t. 375.

This is described more fully to avoid confusion with *E. curta*, from which it is distinguished by the habit, by the shape of the leaves and bracts, and by the dense clothing of long white hairs. The British plant appears to be generally eglandular.

W. SUTHERLAND. Tongue Bay, July 1900, *E. S. Marshall.*—Bank above the Naver, near Betty Hill, July 1897, *E. S. Marshall and W. A. Shoolbred.* This is the f. *grandiflora* Wetts. with corolla 12 mm. in length and stem attaining 12 cm. in height. Plants from Melvich, Sutherlandshire, distributed by Townsend in 1897 as *E. curta*, and from Reay, Caithness, by Mr. Marshall in 1915 under the same name, are, as far as my specimens are concerned, very similar to *E. latifolia.*

7. E. FOULAENSIS Townsend. Stem 1–10 cm. high, shorter and less branched than in *E. latifolia*; internodes long or short. Spike stout, dense. Lower leaves obovate, with obtuse subquadrate terminal lobe, which is broader than long, and 1–3 ovate obtuse teeth on each side. Bracts closely imbricate, broadly ovate or subrotund, obtuse, with 3–4 ovate obtuse teeth, or the uppermost with acute teeth. Largest leaves and bracts 7–8 mm. long. Flowers small. Capsule longer than calyx-teeth. Leaves, bracts, and calyx glabrous or sparingly setulose. Wetts. Mon. t. xii. figs. 7, 8; Towns. Mon. t. 376.

SCOTLAND.—W. SUTHERLAND. Coast, Melvich, Aug. 1897, *Marshall and Shoolbred.* My specimens are shorter, and have shorter internodes than in the figures given by Wettstein and Townsend.

Plants from the south side of Buchaille Etive Mor, near Kingshouse, Argyle, Aug. 1899, closely resemble Wettstein's figure. Concerning these Townsend wrote : "My acquaintance with *E. foulaensis* is as yet very limited. I can only say confer *foulaensis.*" These are more or less setulose, and the broad capsules are deeply emarginate. They are possibly transitional between *E. curta* or *E. borealis* and *E. foulaensis.*

8. E. BREVIPILA Burnat & Gremli. Stem often tall, simple or with few, rarely many, branches from below or, more rarely, above the middle ; internodes generally long, short only at the top of the spike. Leaves and bracts large, 8–11 mm. long, broad and spreading. Upper bracts with lanceolate or subulate, aristate teeth. Corolla 6–12 mm. long. Glandular hairs short and straight, few or many on the bracts and calyx, wanting in f. *subeglandulosa* ; setulæ few or many. Wetts. Mon. t. vii. fig. 8 ; Towns. Mon. t. 374.

ENGLAND.—N. SOMERSET. Peatmoor, Shapwick, June 1898, *fide* F. T. Stem simple, 20 cm. high ; leaves and bracts large. July 1896. Stem branched ; bracts still larger, with 6–7 short lanceolate teeth on each side.—Ashcott Moor, Sept. 1896, *S. T. Dunn.*—On Mendip, near Wookey, Aug. 1907.—Small simple plants with small bracts from Edford, July 1900, and a small much-branched form with small crowded bracts from Tining's Farm, Mendip, formerly referred to *E. brevipila*, are probably forms of *E. campestris* var. *neglecta.*—Cook's Wood, near Flax Bourton, Bristol, June 1916, *I. M. Roper.* Young plants, but well developed and characteristic.—MERIONETH. Dolgelly, June 1906, *A. Loydell*, as *E. curta* var. *glabrescens, fide* E.S.M. These are glandular, and typical *E. brevipila.*—BERWICK. Between Ayrton and Cairncross, July 1900, *C. Bailey.*—KINCARDINE. Roadside, Rickarton, near Stonehaven, July 1901, *C. Bailey.* Some of these are the eglandular form—var. *subglabra* Towns. Mon. p. 18 = f. *subeglandulosa* Towns. (as var.).

SCOTLAND.—PERTH. Ben Laiogh. Aug. 1899, *fide* F.T. Stem short, simple, spike occupying its greater part. More typical plants have been gathered on Ben Laiogh.—INVERNESS. Glen Nevis, Aug. 1899. "Some of the specimens are the eglandular form" (F.T.).—ARGYLE. Allt a Bhalaich, Kingshouse, Aug. 1899, *fide* F.T. Stem 10 cm. high, simple or with 1 or 2 branches. Fruiting-spike stout and dense, in appearance like that of *E. borealis*, but glandular.—Island of Kerrera, Oban Bay, July 1899.—Craig Ghorm, Ballachulish, Aug. 1899, *fide* F. T. A small weak form, with small leaves and bracts.—CLYDE ISLANDS. Bute, July 1847, Herb. G. C. Druce as *E. officinalis.*—E. SUTHERLAND. Near Golspie, Aug. 1897, *Marshall.* (B. E. C.). This is named *E. borealis, teste* Wettstein, but one specimen is glandular.—Near Tongue, July 1897, *Marshall, teste* Wettstein. This is mentioned on account of the large flowers, which are at least 12 mm. long.

With regard to eglandular *E. brevipila*, see pp. 22, 25 of Townsend's Monograph, where he discusses the question as to whether

E. borealis is an eglandular form of *E. brevipila*. The answer to this is, in my opinion, in the negative, *E. borealis* being short with long dense spikes, and bracts with short, broad teeth; while *E. brevipila* is tall and lax, with less dense spikes shorter in proportion to the stem, and bracts with longer, narrower teeth. Thus understood, there should be little difficulty in determining with which species a plant should be placed, irrespective of the presence or absence of glandular hairs.

IRELAND.—E. GALWAY. Woodford, Aug. 1907. Fairly typical but bracts rather small and flower small, blue. In company with this grew *E. gracilis* var. *primaria* and a series of forms which I can only refer to hybrids between the two species. Some of these are tall with numerous slender branches, with smaller bracts than *E. brevipila* and rather small blue flowers; others tall and slender, simple or with 1 or 2 short branches and larger, conspicuous blue flowers. All these bear numerous short glandular hairs. The branched specimens are scarcely distinguishable from *E. campestris* var. *neglecta* except by the colour of the flowers; and the simple plants are very similar to *E. gracilis*. Townsend records a hybrid between these species under the name of *E. difformis* Towns. (Mon. p. 33), but his description does not accord with the Woodford plants. I leave them provisionally as *E. brevipila* × *gracilis*.—Loughrea, Aug. 1907. Corolla pale, larger and more conspicuous than in the Woodford plants, 10 mm. long with the lip 7 mm. broad.—W. GALWAY. Near the lake and on Urrisbeg, Roundstone, Aug. 1907. Variable in height, often simple and slender, with few or many glandular hairs. A short branched form with dense spikes may perhaps be *E. borealis* × *brevipila*.—Clifden, Aug. 1907. Well-developed typical plants, with larger bracts than in most of my Irish gatherings.

9. E. SUECICA Murb. & Wetts. Stem rather stout, 12–20 cm. high, pale brown, thinly pubescent, simple or with 1–4 branches above the middle, and occasionally with 1–2 rudimentary ones below it; internodes very long. Leaves up to 11 mm. long, opposite, in 3–6 pairs, ovate cuneate, with 0–3 ovate, obtuse or the upper with acute teeth on each side. Bracts 10 mm. long, broader than the leaves, with 3–5 ovate, subobtuse or lanceolate-acuminate, flexuous, subaristate teeth on each side. Spike short with fairly long internodes below, stout at the top. Corolla conspicuous, 9–10 mm. long, pale lilac and white. Calyx shorter than its bract, teeth aristate. Capsule shorter than the calyx-teeth. Leaves, bracts and calyx minutely and thinly setulose.

This is the description of plants distributed by H. Möller as *E. tenuis* (Brenner) Wetts. v. *eglandulosa* Murb. ad int., gathered at Skåne, Kungsmarken, Sweden, July, 1895. The name was subsequently altered to *E. suecica* Murb. & Wetts., and Wettstein refers to this locality on p. 298 of his Monograph. On p. 297 he states that it is an early-flowering parallel-form of *E. stricta* and is "distinguished from this by the stem being unbranched or branched in the upper part, by the elongated internodes, the less acute teeth of the leaves and the earlier flowering (May to July)

It is usually extraordinarily like *E. tenuis* Brenn., but is distinguished from it by the absence of stalked glands."

ENGLAND.—W. YORKS. In grassy places above Grass Wood, Grassington, June 1902, *Druce.* Name suggested by Lindman and confirmed by Wettstein. The specimens being young, the teeth of the leaves are broader and more obtuse than in the Swedish plants.

SCOTLAND.—E. Ross. Sedgy swamp near Tain, Aug. 1897, Marshall, as *E. borealis.* Stem attaining 30 cm. high. This only differs in the more elongated fruiting-spike, the plant having been gathered later in the season and being more developed.

10. E. VIGURSII Davey. Stem simple or with a few erect branches about the middle. Fruiting-spike occupying about half the stem, internodes a little longer than the bracts below, hidden by them above. Upper bracts with ovate or ovate-lanceolate apiculate teeth. Corolla dark or pale violet, 8 mm. long. Glandular hairs very numerous on leaves, bracts and calyx. Setæ many or few.

ENGLAND.—CORNWALL. Goonhavern, Perranzabuloe, Sept. 23rd, 1906, *F. H. Davey* (W.B.E.C.), unnamed. This is the type.—Newlyn Downs, Sept. 1907, *C. C. Vigurs, Herb. C. Bailey* (B.E.C.). On this sheet some of the specimens are eglandular and minutely setulose; otherwise they are indistinguishable from *E. Vigursii.*—Kynance Down, July 1916, *Mrs. Wedgwood.* Stem simple, 7 cm. high; flowers smaller, paler; short glandular hairs and setæ numerous on leaves and bracts, and long flexuous glandular and eglandular hairs on the stem.

Var. PALLENS, var. nov. Differs from the type in the pale green colour of the rugose leaves and bracts, in the lanceolate or subulate subaristate teeth of the upper bracts, and in the lilac or lilac and white flowers.

Ab typo differt:—Foliis bracteisque rugosis pallide viridibus, bractearum superiorum dentibus lanceolatis subulatisve subaristatis, floribus lilacinis vel lilacinis et albis.

IRELAND.—CORK. On a roadside bank on the way to Berehaven from Glengarriff, Aug. 15th, 1908. This corresponds in habit and in the abundant glandular hairs with Cornish specimens, and only differs from them in the above characters. In other respects this variety is as distinct as *E. Vigursii* itself from other glandular species. Some of the specimens are eglandular, as in the Newlyn Downs gathering, but are more setulose.

11. E. NEMOROSA H. Mart. Stem branched to the middle; branches often very numerous and compound, spreading at a right angle, then ascending, shorter than the stem. Spike slender, internodes generally long except at the top. Leaves greyish green, those which subtend the larger branches 8–14 mm. long, spreading or deflexed. Bracts 5–8 mm. long, the upper with lanceolate or subulate rarely ovate, acute or shortly aristate teeth. Setæ none or a few on the lower leaves, or, in the var. *ciliata* Drabble, more or less numerous on the margin of the leaves, bracts and calyx-teeth. Wetts. Mon. t. viii. fig. 1; Towns. Mon. t. 375.

When growing the colouring of the plant is noteworthy, the stem being dark purple clothed with hoary pubescence and the foliage dull grey-green. Thus young plants are easily distinguished at sight from *E. stricta* and *E. borealis*.

Dr. Drabble in Journ. Bot. liv. p. 73 (1916), has rendered a service to students of the genus by pointing out that slightly hairy forms of *E. nemorosa* are sometimes taken for *E. curta* var. *glabrescens*, and has separated these under the name of var. *ciliata*. When well grown this species is easily recognized, but is extremely variable in the amount of branching, length of internodes of the stem and fruiting-spike, and in the size of the leaves, bracts and flowers. All these forms may be found growing together, in considerable numbers, and it is then evident that, although so variable in form, they are all essentially the same, and can be distinguished at a glance from any other species. This variability is doubtless due, partly to the amount of nutriment that the host-plant is capable of providing, and partly to the space for development allowed by the surrounding vegetation.

As forms of *E. nemorosa* have been taken for *E. stricta*, *E. curta* and *E. gracilis*, it may be well to give an extended list of localities for the typical plant, and also for those forms which have been or are liable to be misnamed.

England.—N. Somerset. Slope over the Caves in Cheddar Gorge, July 1900, *J. W. White*, *fide* F. T. Small plants, 7–16 cm. high.—Grassy lane, Rowberrow near Churchill, Sept. 1900, *fide* F. T.—The Mineries on Mendip, Aug. 1905, and Wookey Hole, Mendip, Aug. 1907. Some of these are typical and others have unusually large spreading bracts 11 mm. long, and large flowers; resembling *E. brevipila* but not glandular, and the branching that of *E. nemorosa*.—Limestone ridge from Failand to Cadbury Camp, July, Aug. 1916; on roadsides and in rough pastures, together with a glandular form which I name *E. campestris* var. *neglecta*; this is so similar to *E. nemorosa* that only the glands distinguish it.—Queen Charlton, Sept. 1901. Some of the plants are setulose and come under the var. *ciliata* Drabble.—Roadside above Bathampton. Stem not tall, much branched, internodes short, flowers large. This recalls *E. Kerneri*, but the leaves are larger and the colouring different.—Wilts. Chalk downs, Boreham near Warminster, Sept. 1914. With the typical plant grow some copiously and compactly branched plants not exceeding 10 cm. high, with small leaves and bracts and more brightly coloured flowers. These may form a transition to *E. Kerneri*.—I. Wight. Apesdown, Aug. 1916. Approaching var. *ciliata*.—N. Hants. Odiham, on bank above Chalk-pit, Sept. 1903, *C. E. Palmer*, as *E. stricta*. "*E. nemorosa*," *E. S. M.* (B. E. C.). These vary in the same way as the plants growing on chalk at Boreham, Wilts. See above.—W. Sussex. Roadside, Colgate, July 1900, *J. W. White*, *fide* F. T. Near Cross-in-Hand, Aug. 1906, *W. A. Vice*. Stems tall, stout, with short slender branches throughout their length. This form is not uncommon growing with the ordinary type.—Surrey. Haslemere on railway-banks, Aug. 1894, *E. S. M.*, as "? *E. nemorosa*." Leaves small, but typical *E. nemorosa*.—

Kent. Higham, Canterbury, Sept. 1904, *C. E. Palmer*. Not tall but much branched, internodes short.—W. Essex. Amongst tall grass, Fordham Heath, Aug. 1913, *G. C. Brown*, as *E. stricta*. This is tall weak *E. nemorosa*.—Tiptree Heath, 1912, *G. C. B.* as *E. gracilis*. Dr. Lindman writes "this is *E. stricta* forma." I consider it to be typical *E. nemorosa* with rather large flowers.—Herts. Welwyn, Broxbourne, *W. J. Blake*, 1820.—Berks. Chalky bank of the Kennet, Newbury, Aug. 1906, *A. B. Jackson* (B. E. C.).—Oxford. Crowell, Sept. 1892 (B. E. C.).—Minster Levell, 1912, *G. C. B.* as *E. stricta*.—Suffolk. Chalk-pit, Somersham, *G. C. B.* 1912 as *E. gracilis*.—Huntingdon. Holme Fen, 1886, *A. Fryer*. "Very luxuriant *E. curta* var. *glabrescens*" E. S. M. This is very large and bushy *E. nemorosa*.—Northampton. Helpstone, "*E. curta* var. *glabrescens*" E. S. M., "*stricta*?" Lindman.—E. Gloucester. Cranham woods, Sept. 1912.—Kilcot Valley, Cheltenham, July 1910, *C. Bailey*. An abnormal form with slender stem and long slender branches, and bracts equalling or exceeding the leaves.—W. Gloucester. Symond's Yat, Huntsham Hill, Sept. 1900, *D. Fry* and *J. W. White*. Very slender, like the last. Of this Townsend wrote, "*E. nemorosa* simulating *E. gracilis*."—Amberley, near Stroud, Sept. 1907, *C. Bailey*. Short and compact plants with numerous compound branches. Others, less branched with more brightly coloured flowers, appear to approach *E. Kerneri*.—Grassy lane on the borders of Westridge Wood, Wotton-under-Edge. Very luxuriant plants with stout stem 35 cm. high, and very numerous spreading compound branches, forming small bushes nearly 30 cm. across; the largest cauline leaves 12 mm. long. *E. nemorosa* probably attains the largest size of any European species, and the Wotton plants are the largest I have seen. On the open ground on the oolite which caps this hill many forms are found,—tall and simple or with more or less numerous branches; with leaves and bracts large or small; with small flowers or with large ones like those of *E. Kerneri*, and some of these are apparently hybrids with that species. On the label of some small specimens with erect branches Mr. Townsend wrote "confer *E. stricta*," and on another "*E. borealis*," but on comparing and studying all the forms, I am forced to the conclusion that these belong to *E. nemorosa*. Up to the present time I have not met with any other species in the neighbourhood except *E. Kerneri*; even this is scarcely typical, and may be a transitional form.—Syston Common near Mangotsfield, Sept. 1901, f. *compacta*; strong plants, 14 cm. high, with very numerous compound branches nearly as long as the stem, short but distinct internodes, and small nearly included flowers. This and the Amberley plant may be compact forms due to exceptional conditions of the soil or of the host-plant.—Hereford. In short turf, Bishop's Wood, July 1906, *S. H. Bickham* (W. B. E. C.).—Salop. Chetwick, Sept. 1903, *J. C. Melvill*, *teste* Wettstein (B. E. C.).—Glamorgan. Débris of lime-kiln, Oystermouth near Mumbles Head, Sept. 1909, *C. Bailey*. This is a well-marked example of var. *ciliata* Drabble.—Merioneth. Pant Evion, Arthog, Aug. 1915, *W. C. Barton* (W. B. E. C.).—Denbigh. Sand-dunes between

Llandudno and Deganwy, Sept. 1909, *W. G. Travers* (B. E. C.). Named by me, with doubt, *E. borealis*, on account of the rather large bracts, but I now place it without hesitation with *E. nemorosa*. —Leicester. Salt Way, Aug. 1906, *C. B. Headly* (W. B. E. C.). Bugworth, Aug. 1911, *W. Bell* (W. B. E. C.).—Groby, July 1912, *A. R. Horwood* (W. B. E. C.). This is probably shade-grown and is in consequence much altered in appearance. The stem is simple or nearly so, of a pale brown colour when dry, and the internodes are very long.—W. Lancaster. Sand-hills near the lake at Fairhaven, St. Anne's-on-the-Sea, Sept. 1902, *C. Bailey*. Stem 26 cm. high, branches very numerous, erect, spikes long with short internodes. Presumably growing with *E. curta*, which is abundant in this locality, and resembling it in some respects, but it is quite glabrous. It appears to be a transitional form.—W. Yorks. Between Scaleber and Attermire, Aug. 1891, *J. A. Wheldon*. "*E. nemorosa*" F. T. "*curta* forms, though in some respects simulating *E. nemorosa*," E. S. M. (B. E. C.). The specimen before me has unusually long internodes, is quite glabrous, and is undoubtedly *E. nemorosa*.—Westmorland. Arnside, Aug. 1915. Well-grown, typical plants.

Argyle. Glen Etive, Aug. 1899. Respecting this Mr. Townsend wrote, "Confer *E. stricta* Host," but in my opinion it is a form of *E. nemorosa*. It has many erect compound branches with the large characteristic leaves of *E. nemorosa* at the nodes; the spikes are rather dense, but more slender, on account of the small bracts, than in *E. stricta*.

12. E. campestris Jordan var. neglecta var. nov. Stem 10–30 cm. or more high with many or few spreading-erect branches above and below the middle, internodes generally long; branches shorter than the stem, sometimes compound. Fruiting-spikes with internodes generally longer than the bracts except at the top. Cauline leaves 6–8 mm. long, ovate or ovate-lanceolate, more or less spreading or deflexed, subobtuse. Bracts 6–7 mm. long, the upper with lanceolate or subulate subaristate teeth. Corolla about 8 mm. long, white and lilac or violet with yellow throat. Glandular hairs short, straight, more or less numerous on leaves, bracts and calyx. Setæ small, few. Towns. Mon. t. 77.

Ab *E. campestri* Jordan (*E. Tholeyroniana* Gandoger) differt:—Caule 10–30 cm. alto, in parte inferiore superioreque ramoso, ramis non congestis neque corymbosis; spica laxiore; floribus minoribus; pilis glanduliferis brevioribus, paucioribus.

This is the description of the British form, and also applies to some plants with flowers of medium size distributed by Continental collectors, and to Townsend's figures of specimens from Chambéry and Matlock. The form distributed by Gandoger under the name of *E. Tholeyroniana*, differs in the large, conspicuous flowers, the crowded, corymbose branches springing from the middle of the stem or still higher, rarely lower, in the crowded leaves and bracts forming dense spikes, and in the more numerous and rather longer glandular hairs. It is therefore necessary to enquire as to which form is the type of *E. campestris* Jordan, and for this purpose I give the essential points of Jordan's description and those of Gremli and Rouy:—"Corollæ (haud parvæ) tubo calycino *fere superante* . . . foliis parvis . . . patulis pube minute sæpe glandulifera adspersis ovato oblongis basi in petiolum angustatis profunde dentatis, dentibus utrinque sæpius 4 lanceolatis, foliorum superiorum breviter acuminatis, caule ramosissimo, ramis tenuibus *subarcuato-patulis*." Jord. Pugil. p. 131 (1852); Wetts. Mon. p. 193 (1896); Towns. Mon. p. 40 (1897). Gremli describes it as a variety of *E. Rostkoviana*:—"Plant less glandular with shorter hairs, branches more spreading and leaves smaller." Gremli, Fl. Switz. Engl. ed. p. 303 (1889). Rouy describes it as *E. Rostkoviana β. campestris* Chabert:—"Tige plus raide et plus elancée, rameuse plus haut; bractées plus courtes et moins larges; glandes plus courtes; floraison tardine." Rouy, Fl. France, xi. p. 147 (1909). These descriptions, as far as they go, are not inconsistent with each other, but contain no definite statement as to the size of the flowers. Jordan only says "corollæ haud parvæ," which may mean anything between large and small, but, as Gremli and Rouy associate the plant with *E. Rostkoviana*, it may be inferred that they consider the flower to be large.

Wettstein, as he had not seen the plant living, simply quotes Jordan's description, but it may be gathered from his analytical key (Mon. p. 71) and the remarks on p. 194 that he attributes to it the following characters:—Corolla large, 10–15 mm. long; stem branched above the middle or above as well as below it; bracts small; glandular hairs short. He distinguishes it from *E. Rostkoviana* by the stem of the latter being branched below the middle, by the longer bracts, and long glandular hairs. His figure t. xii. f. 1 of an original specimen represents a tall bare stem branched at the top, and is not unlike a weak specimen of *E. Tholeyroniana*. It is also similar to an authentic specimen in Herb. Mus. Brit. of which Mr. E. G. Baker has kindly furnished me with a sketch, and this has large flowers. Wettstein quotes *E. Tholeyroniana* (spelt *E. Tholeyriana*) as a synonym of *E. campestris*, and it is to this that the description given above applies. It is evident that he looks upon this as the type, and makes no mention of a small-flowered form. He may not indeed have seen this, or, considering it as weak or undeveloped, passed it over as unworthy of notice.

The *exsiccata* which Wettstein quotes being represented in Herb. C. Bailey, I am able to give an account of the different forms they contain, which are as follows;—*Billot* 3671 *E. campestris*, Chambéry 1861, leg. Paris. This has small flowers and is very near to the British forms, except that it is more densely glandular.—*Schultz* x. 930. *E. campestris* Chambéry 1861, leg. Paris. This sheet contains the large-flowered *E. Tholeyroniana*, small-flowered *E. campestris*, *E. stricta* or *E. nemorosa* and *E. salisburgensis*.—*Schultz* n. s. cent. 1. 930 bis *E. campestris*, Bourges 1869 leg. Ripart contains *E. Tholeyroniana* and *E. stricta*. *Baenitz* No.—*E. Tholeyroniana*, Arnas 1873, leg. Gandoger.—*Gandoger* 404 *E. Tholeyroniana* Arnas 1874.

Taking all things into consideration, it appears to me that the large-flowered form must be regarded as the true *E. campestris* Jordan, which is a very well-marked plant, not yet found in Britain; that this is well separated by definite characters from the small-flowered form, and that the latter should be distinguished by a varietal name. I therefore propose the name of var. *neglecta*, not disregarding the possibility that further observation and study may show that some of the British plants are of hybrid origin.

The following scheme will show concisely the characters which separate *E. campestris*, the var. *neglecta*, *E. Rostkoviana* and *E. brevipila*:—

	Corolla large, its tube elongating at the end of the flowering	1.
	Corolla smaller, its tube not elongating	2.
1.	Stem branched below, internodes long, spike lax except at the top, leaves and bracts large. glandular hairs long	*E. Rostkoviana.*
—	Stem branched above, often corymbosely, branches crowded, spike dense, leaves and bracts smaller, glandular hairs shorter ...	*E. campestris.*
2.	Stem branched below, internodes long, spike broad with long internodes below, leaves and bracts broadly ovate with numerous teeth	*E. brevipila.*
—	Stem more often with more spreading branches above and below the middle, spike more slender, leaves and bracts more narrowly ovate with fewer more acute teeth	[var. *neglecta.* *E. campestris,*

ENGLAND.—N. SOMERSET. Failand near Bristol, Sept. 1898, *C. Bucknall.* Recorded in White's *Bristol Flora* (1912) as *E. brevipila.* In 1916 this was observed from July to the end of September, and its known area greatly extended. It is plentifully distributed at intervals along the limestone ridge on grassy roadsides and in rough pastures from Failand to Cadbury Camp, a distance of 4 miles, and is everywhere mixed with *E. nemorosa.* To this it is so similar in habit that I have only been able to distinguish it by the short glandular hairs. I have suggested above the possibility of its being of hybrid origin, and this point requires further investigation.—In a thicket, Charlecombe Bay near Clevedon, Sept. 1916, *I. M. Roper*: fine specimens attaining 40 cm. in height.—GLAMORGAN. Oystermouth near Mumbles Head, Sept. 1909, *C. Bailey.* Stem nearly 30 cm. high; similar to the Somerset plants.—DERBY. Matlock, Aug. 1915, and Middleton-by-Wirksworth, Sept. 1915. These, kindly sent by Dr. Drabble, differ slightly in the branches springing from the stem at a sharper angle, in the principal leaves being less spreading, and in the rather broader corolla.

13. E. GRACILIS Fries. Stem slender, wiry, dark purple, simple or branched about the middle, internodes often very long, seldom short; branches much shorter than the stem, erect. Spike long and slender, lower internodes long. Leaves 5–7 mm. long. Bracts 5–6 mm. long, the upper with lanceolate or subulate acute or apiculate teeth. Leaves and bracts glabrous rarely pubescent. nigrescent. Corolla small, white, lilac or dark violet. Capsule, in the specimens seen, generally shorter than the calyx, but according to Wettstein equalling or exceeding it. Wetts. Mon. t. viii. fig. 2; Towns. Mon. t. 376.

ENGLAND.—CORNWALL. Kynance Downs, July 1916, *Mrs. Wedgwood*. Stem 3–6 cm. high, seldom branched, internodes much shorter than in northern plants, leaves blackish when dry, flowers with violet upper and white lower lip.—E. SOMERSET. On Exmoor above Porlock, Sept. 1910. Stem slender or comparatively stout, flowers rather large, blue.—DORSET. Stepe Heath, Corfe Castle, June 1916, *I. M. Roper*. Stem and internodes nearly as short as in the Kynance Downs plant, but more branched; flowers dark violet.—CARNARVON. Lake Padarn, Llanberis, Aug. 1916, *Mrs. Wedgwood*. Similar to Scotch plants, but some of the specimens have long, narrow leaves nearly 12 mm. long.—WESTMORLAND. Bank of a rill above Elmhow, Grisedale, and slopes above the east shore of Ullswater, Aug. 1915. Small plants with very small leaves; flowers lilac and white.

SCOTLAND.—INVERNESS. Glen Roy, Glen Spean and Glen Nevis, Aug. 1899.—ARGYLE. Ben Cruachan, Glen Etive and Island of Kerrara, Oban Bay, Aug. 1899. All these Scotch plants were confirmed by Townsend.

IRELAND.—GALWAY. Woodford, Aug. 1907. Stem tall, attaining 22 cm., simple or with 1 or 2 branches, flowers large, blue. This may be var. *primaria* Fr.; the flowers are like those of specimens from Kinlochewe which Mr. Townsend referred to this variety. Wettstein describes it as having flowers entirely violet and leaves tinged with red. The Irish plant has the leaves and bracts rather greener than usual, and the upper bracts with subulate, aristate teeth.—On the banks of the Shannon, Rossmore, Aug. 1907. This also has bracts with subulate, aristate teeth; the flowers vary from white to lilac and violet.—Moors near Roundstone, Aug. 1902, and on Urrisbeg, Aug. 1907. On Urrisbeg also there occurred plants which may be × *E. Areschougii* Wetts.—*E. curta* × *gracilis*. The habit is that of *E. gracilis*, but the leaves, bracts and calyx are clothed with fairly long hairs as in *E. curta*. The latter plant, however, was not seen on Urrisbeg.—Clifden, Aug. 1907.

14. E. SCOTICA Wetts. Plant greener and stem more often simple or with fewer branches than *E. gracilis*, and consequently the fruiting-spike often longer in proportion to the stem; internodes long. Leaves and bracts 5–7 mm. long; teeth of the upper bracts triangular, lanceolate, or subulate and shortly aristate. Flowering-spike broader at the top and appearing subcapitate. Leaves, bracts and calyx glabrous or minutely ciliate and setulose. Wetts. Mon. t. viii. fig. 8; Towns. Mon. t. 376.

WALES.—CARNARVON. Cwm Idwal, Aug. 1909, *G. Goode*. Weak plants 8 cm. high; spike with long internodes and few flowers; leaves and bracts with 1–3 ovate, obtuse rarely acute teeth on each side, sparingly and minutely setulose. Flowers nearly white. I refer this to *E. scotica* with considerable doubt, as it bears some resemblance in the shape of the leaves and bracts and their obtuse teeth to some forms of *E. minima*. Further information on the *Euphrasiæ* of this district is desirable.

SCOTLAND.—INVERNESS. Glen Spean, Aug. 1899.—ARGYLE. Oban, Aug. 1899. Strong plants with 2–4 branches from near the base of the stem. Normal plants were gathered at Cam Glen, Buchaille Etive Mor, Ballachulish and on Ben Cruachan. All these were named by Townsend.—Ross. Wet boggy moors east of and near Poolewe, Aug. 1897, *F. Townsend* (B. E. C.).—W. SUTHERLAND. Near Betty Hill, July 1897, *E. S. Marshall* (B. E. C.).

IRELAND.—GALWAY. Boggy slope on Urrisbeg, Roundstone, Aug. 1902. Small plants not exceeding 8 cm. high.—Clifden and Woodford, Aug. 1907.

15. E. MINIMA Jacq. Stem simple or branched below the middle, internodes, in the British forms, generally short. Fruiting-spike with long or short internodes. Lower cauline leaves obovate-cuneate with a large obtuse terminal tooth and 1–2 ovate obtuse teeth on each side. Bracts ovate, obtuse or subacute with 2–3 rarely 4 ovate or lanceolate obtuse or acute teeth on each side. Flowers yellow, violet or white. Capsule nearly equalling or exceeding the capsule. Leaves, bracts and calyx nearly glabrous or minutely setulose. Wetts. Mon. t. viii. figs. 10–14; Hiern in Journ. Bot. xlvii. 165, t. 497 A (1909).

Wettstein describes the mature capsules as exceeding the calyx, but, in many undoubted examples of *E. minima* gathered in the Western Alps, the capsules usually fall short of the calyx, and rarely exceed it.

SOMERSET. Great Cornham, Exmoor, perhaps nearly 1250 ft. alt., 24th August, 1908, *W. P. Hiern*. Corolla yellow. See Mr. Hiern's elaborate paper on the discovery of *E. minima* as a British plant, in this Journal, *loc. cit.*

Var. NANA Rouy? *Flore de France*, xi. p. 155 (1900). Stem 3–6 cm. high, simple, lower internodes very short so that the leaves are crowded below. Fruiting-spike with short or long internodes. Leaves 3 or at most 4 mm. long, the lower obovate cuneate, with a large rounded terminal tooth and 1 small ovate tooth on each side, the upper with 1–2 teeth on each side. Bracts ovate with 1–2 rarely 3 triangular or oblong-lanceolate obtuse or subacute teeth on each side. Corolla 5 mm. long, white or lilac and white, with violet veins and a yellow spot. Capsule generally exceeding calyx-teeth, large in proportion to the size of the plant. Leaves, bracts and calyx minutely setulose.

On the boggy banks of a rill above Elmhow, Griesdale, Westmorland, Aug. 12th, 1915, and (the taller form) on slopes above the east shore of Ullswater, below Place Fell.

Rouy's description of var. *nana* is as follows:—"Tige de 3–5 cent., simple, filiform; feuilles très petites, paucidentées, à dents obtuses; bractées crenelées, à dents obtuses." With this, as far as it goes, the Westmorland plants agree exactly. Bearing in mind that Wettstein considers *E. scotica* to be nearly identical with *E. minima* (see Mon. p. 171), the Westmorland plants differ from the former in the very short lower internodes, in their small size and in the still more obtuse terminal and lateral teeth of the leaves and bracts. From *E. curta* they differ in the peculiar form and small size of the leaves, and in the very short pubescence.

Var. ARBUSCULA, var. nov. Plant small, 2–5 cm. high, green. Stem much branched at the middle; branches spreading then ascending, often again branched, nearly as long as the stem.

Planta nana, 2·5 cm. alta, viridis. Caulis in media parte ramosus, ramis arcuato-ascendentibus, sæpe iterum ramosis, caulem quasi æquantibus. Folia 3 cm. longa vix excedentia, inferiora obovato-cuneata, dente terminali magno, subquadrato vel rotundato, dentibus utrinque 1–3 ovatis, obtusis. Bracteæ ovatæ, dentibus utrinque 2–3, ovatis vel lanceolatis obtusis vel subacutis. Calycis dentes lanceolati acuti bracteam superantes. Corolla 4–5 mm. longa, alba vel lilacina, striis violaceis et maculâ luteâ notata. Capsula oblonga, calycis dentes sæpe superans. Folia, bracteæ et calyces minutissime pubescentes.

WESTMORLAND. On the slope under Place Fell, south of Ullswater, Patterdale, Aug. 17th, 1915, *C. Bucknall*, and Aug. 1916, *R. Nixon.*—DERBY. "Chelmerton—very high part of the Peak. The common size—Sept. 20th, 1862," *C. E. Palmer*, as *Euphrasia officinalis* (Herb. Druce).

This is remarkable for the small size of all its parts, for its intricate branching and for the few obtuse teeth of the leaves and bracts. Excessive branching is sometimes caused by the main stem being bitten off or otherwise damaged, but that it is not so in this case is proved by the presence of the main stem and by the regular development of the plant.

It is with considerable hesitation that I place these two forms here as varieties of *E. minima*, and it is only after careful and repeated comparison, and after having failed to find a closer relationship with any other species, that I have at length decided to leave them temporarily in this position. The chief differences, perhaps not very important ones, that distinguish them from *E. minima* are: (1) the crowding together of the lower leaves in var. *nana*, and the numerous, often compound branches of var. *arbuscula*, which are unlike those of any form of *E. minima* with which I am acquainted; unless Schur's "*E. humilis ramosissima* = *saxatilis*" to which Wettstein refers (Mon. p. 153) is connected with the Patterdale plant. (2) The constantly pale colour of the flowers, without any tendency to the yellow and violet which is often seen in *E. minima*. As there is, however, a var. *pallida* of *E. minima*, the pale colour of the flower does not of itself exclude our plants from the group. Notwithstanding their similarity in many respects, it remains doubtful whether they have been evolved from the same ancestors as *E. minima*, and the two varieties appear to be so closely related that if one is rejected the other can scarcely retain its position.

16. E. KERNERI Wetts. Stem shorter than in *E. nemorosa*, stout, copiously branched, rarely simple; internodes short; branches spreading-erect, often compound. Spike with internodes short, but not hidden by the bracts except at the top. Leaves and bracts smaller, more acutely and deeply dentate, more erect and more shining than in *E. nemorosa*; leaves subtending the principal branches largest, 6–8 mm. long; bracts 5–6 mm. long, the upper with triangular, lanceolate or subulate aristate teeth. Calyx-teeth and veins often purplish or blackish. Corolla brightly coloured, 7–10 mm. long; tube elongated after the flowering, but in small-flowered plants not conspicuously so. Leaves, bracts and calyx appearing glabrous, but rather rough with very minute setæ. Wetts. Mon. t. ix. fig. 10; Towns. Mon. t. 375.

Small-flowered plants are sometimes distinguished with difficulty from *E. nemorosa*, and, on the other hand, large-flowered forms of that species simulate *E. Kerneri*. There are also forms which appear to be intermediates or hybrids between the two species.

ENGLAND.—DEVON. Near Plympton, Sept. 1902. Stem attaining 16 cm. high, with longer internodes and therefore less compactly branched than usual.—N. SOMERSET. Rowberrow Down, Mendip, on boggy ground, Sept. 1900, 1901, 1908 and 1916. Concerning the specimens gathered on Sept. 15th, 1900, which were in bad condition on account of the lateness in the season and from having been bitten by rabbits, Townsend wrote: "I can only put this to *E. Kerneri*, but the remarkable diffuse branching, the branches compound and the lower ones very slender render it remarkable. On carefully examining the central stem, it will be seen that it has often been arrested from grazing by cattle, causing growth and developments from the lower leaves, but this does not seem in all cases to account for the unusual development of branches. . . . A specimen from W. H. Purchas from Cheddar, Sept. 5, 1853, approaches the Black Down (Rowberrow) form."

Having observed this plant in succeeding years under more favourable conditions, I can now state definitely that it is *E. Kerneri*. As far as I have explored the locality it is sparing in quantity, although other forms now to be mentioned are very abundant. The most remarkable of these is a plant which Townsend named *E. Levieri* Wetts. (*E. curta* × *Rostkoviana*), but which I now feel compelled to refer to × *E. Rechingeri* Wetts. (*E. Kerneri* × *Rostkoviana*).

The following is a description of this plant:—Stem 3–10 cm. high, with numerous, crowded, compound branches often as long as the stem; internodes short, but longer in the taller plants with fewer branches, which resemble *E. Rostkoviana*. Leaves and bracts ovate, with ovate obtuse or triangular acute teeth, all, as well as the calyx, pubescent with long or short hairs, and often with few or many long glandular hairs. Corolla large, its tube elongating after the flowering, brightly coloured. Capsule usually short and broad, rounded and deeply emarginate at the top.

Having had the opportunity of thoroughly exploring the ground in the middle of June 1916, I found in a grassy lane which leads to Rowberrow Down an abundant crop of young *E. nemorosa* and a few plants of *E. borealis*, which, however, was more abundant in a neighbouring valley. *E. Kerneri*, *E. Rostkoviana* and the hybrid plant grew in the boggy valley, and the two latter also on the higher and drier ground in deep, spongy turf. In September *E. nemorosa* was still abundant in the lane, but was apparently a second crop, badly nibbled, small and not well developed. This extended into the boggy ground, where it was often excessively branched as in the specimens of *E. Kerneri* examined by Townsend. The plants were quite glabrous and could not be taken for *E. curta*, nor is that species to be found in the neighbourhood. Under these circumstances it must be acknowledged that *E. Kerneri* is more likely to be one of the parents of the hybrid plant than *E. curta*. This was described by Wettstein under the name of *E. Rechingeri* in Osterr. bot. Zeitschr. xliv. Bd. No. 12 (1894). See Wetts. Mon. p. 289.

WILTS. Chalk downs, Boreham, near Warminster, Sept. 1914. Stem 8 cm. high with numerous crowded branches; flowers small.—SURREY. Colley Hill, Reigate, *C. E. Salmon.*—Bletchworth Hill, *E. S. Salmon.*—Chipstead, *R. S. Standen.*—Guildford, *J. Comber*, as *E. stricta*. All these are characteristic *E. Kerneri*, with flowers varying from 7 to 10 mm. in length.—Riddlesdown 1885. Herb. Bailey ex herb. Eyre de Crespigny. Small plants with large flowers 12 mm. long and lip very broad.—BUCKINGHAM. Kemble, Aug. 1909, *F. L. Foord-Kelcey.*—W. GLOUCESTER. On the oolite above Wotton-under-Edge, Sept. 1907 and 1914. Some of these are fairly typical, but others partake of the characters of *E. Kerneri* and *E. nemorosa*, and appear to be intermediate or hybrid forms. They have stems 16–30 cm. high with few branches, and internodes much longer than the Surrey plants; corolla conspicuous, 9 mm. long, lilac and white. Neither Wettstein nor Townsend records a hybrid between these species.—On ground below Amberley Inn, Amberley, near Stroud, Sept. 1907, *C. Bailey.* Very strong, copiously branched plants, forming small bushes 15 cm. high and broad; flowers rather small. This also is on oolite and deviates from the type.—WESTMORLAND. Roadside through woodland above Arnside, Aug. 1915. Small plants with a few short branches; corolla 8 mm. long, conspicuous and brightly coloured.

17. E. ROSTKOVIANA Hayne. Stem with few, rarely many, long branches from below or above the middle; internodes long. Spike stout, lower internodes often much longer than the bracts. Leaves large, 8–11 mm. long. Bracts 7–10 mm. or more long, the upper with triangular or ovate teeth in young plants, ovate-lanceolate or subulate, acute, apiculate or aristate when old. Corolla normally large, the tube elongated after flowering. Glandular hairs numerous, long, flexuous, on the stem, bracts and calyx, often shorter and less numerous on the leaves; eglandular hairs long and spreading on the upper part of the stem and branches, short on the leaves and bracts. Wetts. Mon. t. ix. fig. 1; Towns. Mon. t. 377.

Easily distinguished from all other British species except *E. fennica* by the long, flexuous, glandular hairs.

ENGLAND.—N. SOMERSET. Peatmoor, Shapwick, June 1898 and July 1906. Stems simple or much branched. Aug. 1914, *I. M. Roper.* Stem simple, 36 cm. high.—Peatmoor, Ashcott, July 1915. Stem 7 cm. high with leaves and flowers smaller than usual.—Cheddar, July 1907. *I. M. Roper.*—Rowberrow, Sept. 1907. Stem

30 cm. high, fruiting-spike long and stout. July 1916. Stem 9 cm. high, with numerous long slender branches and large conspicuous flowers.—Edford, July 1900. Stem 10 cm., simple; internodes short and flowers small.—Broadfield Down, near Bristol, Oct. 1908. Simple or branched; fruiting-spikes long with short internodes.—DORSET. Scotland Farm, Corfe Castle, June 1916, *I. M. Roper*. Small, young plants with nearly simple stem, suggestive of *E. fennica*.

SCOTLAND.—PERTH. Meadow at foot of Ben Lawers, July 1906, *C. Bailey*.—KINCARDINE. Seashore at Bervie, July 1891, *C. Bailey*.

IRELAND.—CORK. Glengarriff, Aug. 1908.

18. E. FENNICA Kihlman. Stem 14–18 cm. high, simple or with 1–2 slender branches at the base. Fruiting-spike occupying the greater part of the stem, with internodes long below, regularly decreasing upwards and visible nearly to the top. Leaves about 5 mm. long, narrow with 3–4 ovate or lanceolate obtuse teeth on each side, those subtending the branches 7–8 mm. long with ovate teeth. Bracts opposite with 4–5 teeth on each side, the lower with ovate, the upper with lanceolate or subulate acute subaristate teeth. Corolla about 5 mm. long, with included tube. Capsule shorter than the bracts and calyx-teeth. Glandular hairs long, flexuous, abundant on stem, leaves, bracts and calyx; simple hairs short, setose, principally on the lower leaves.

Not having seen a description of *E. fennica*, I have described specimens kindly furnished by Mr. Druce: these were named by Dr. Lindman and corroborated by Wettstein. They differ from *E. Rostkoviana* in the nearly simple stem, the smaller bracts which are regularly disposed in pairs throughout almost the entire length of the stem, and in the small flowers.

ENGLAND.—SOMERSET. Exmoor, *Druce*, det. Lindman.

IRELAND.—GALWAY. Clifden, Aug. 22nd, 1911, *G. C. Druce*.—Clifden, Aug. 16th, 1907, *C. Bucknall*, as *E. Rostkoviana*.

19. E. SALISBURGENSIS Funck. Stem simple or branched below. Leaves and bracts narrow, with a few distant spreading teeth and the sides between them nearly parallel. Capsules glabrous or with a few decumbent hairs on the margin. Wetts. Mon. t. x. figs. 6–10; Towns. Mon. t. 376.

IRELAND.—GALWAY. Turfy ground near the sea, Dog's Bay, near Roundstone, Aug. 1907. Stem not exceeding 6 cm. high, slender as well as the flexuous branches. This differs from Continental forms in the branches spreading nearly horizontally.

Not having had the opportunity during the preparation of this paper of consulting original descriptions, I have taken Wettstein's Monograph as the starting-point, and must refer the student to that work and to Townsend's Monograph of the British species for the bibliography and synonymy of the genus. Further, this being solely an attempt to simplify the study of the species as they occur in Britain, I have omitted any reference to Wettstein's views on the evolution of the species, and have only touched upon his theory of the relationship between æstival and autumnal species which he calls "parallel forms." We have, however, one or perhaps two instances of this supposed relationship to which it is well to draw attention. These are *E. suecica* and *E. cærulea* (?), which Wettstein considers to be related to *E. stricta* and *E. curta* respectively as æstival forms. When these two species are better known—if, indeed, the latter proves to be identical with the Continental plant—it will be interesting to learn to what extent they give support to that theory. As far as morphological characters go, I must confess that to me a close connection between these species is not very evident.

I venture to hope that the general conclusions at which I have arrived will be acquiesced in by those who take an interest in this genus. At the same time, I cannot expect that all my determinations of doubtful and apparently intermediate plants will be always accepted. In many cases a more accurate knowledge of the circumstances of growth, of the other species which grow in the same locality, and, above all, a more representative selection of examples in regard to form, size and stage of development might lead to a different decision. Collectors will do well to bear this in mind.

ADDENDA ET CORRIGENDA.

P. 2. l. 33, for Bayley read Bailey.

„ 4. „ 23, after *campestris* add var. *neglecta*.

„ 7, „ 8, for 16 read 17.

„ 7, „ 10, for 17 read 18.

„ 7, „ 27 after *campestris* add var. *neglecta*.

„ 16, „ 4, for June 1902 read May 1906.

„ 18, ll. 18 from top and 7 from bottom. Miss E. Armitage writes: "Huntsham Hill is in Herefordshire: it closely adjoins Symond's Yat, which is in W. Gloucestershire, the boundary running at the foot of the Yat Rock. The Bishop's Wood locality is also on Gloucestershire border in Herefordshire, a few miles higher up the River Wye."

P. 23, after l. 40 add:—Carnarvon. Cwm Meillionen, Beddgelert, June 21, 1916. Very near to *E. minima* var. *nana* from Griesdale, except that the bracts are rather larger, the spike broader and the flowers more brightly coloured. These specimens tend to show that the varieties described on pp. 23, 24, are correctly placed with *E. minima*. This and the other two interesting plants here mentioned are contained in a parcel of *Euphrasiæ* received from Mr. C. E. Salmon.

P. 24 after l. 16, add:—Monmouth. Slope of mountain (about 1000 ft.) above Llanthony, Sept. 8th, 1916, *E. B. Bishop*. This corresponds in every detail to *E. minima* var. *arbuscula* from Patterdale. It is interesting to find that this form is not confined to Westmorland and Derby, and that its range extends much farther to the south. It will probably be found elsewhere in similar situations in mountainous districts.

P. 27 after l. 31 add:—Perth. Slopes near Lawers Burn, Sept. 12th, 1915, *C. E. Salmon*, as *E. Rostkoviana*. This is similar in habit to *E. fennica* Kihlman, but has larger bracts, broader flowering-spike, especially at the top, and rather conspicuous white flowers. It appears to be intermediate between *E. Rostkoviana* and *E. fennica*.

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